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1.0 Product Overview

WinEx is a high performance excavation takeoff software program, for earthwork estimators, contractors and professionals. The product makes many of the earthwork related takeoff tasks easy, simple, fast and accurate.

Capabilities include full maps, cross sections and 3D representations. Quantity estimates may be transferred to any other WINDOWS® based estimating programs and spreadsheets, giving the user the easiest possible interface to other programs.

WinEx Pro is the professional version of our WinEx product, with advanced routines and functions, that simplifies complex procedures involved in estimating Cut & Fill and earthwork related site calculations. It includes many more powerful features that are applicable to site contractors such as subsoil strata, imported fills and many other features and input tools to easily and accurately reflect the jobs requirements.

This manual covers all WinEx Pro features, some of which are not available in the WinEx product. Installation is the same for both products.

The manual is divided into three sections. The first, which you have hopefully already completed, covers installation of the software. The second section is a tutorial, which will show you how to do a simple takeoff. The final section is a reference section, which will be similar to the online help in the program.

It is highly recommended that you do the tutorial before attempting to do your first real job. Also included in the CD are the tutorial job completed (you can compare it to your work to see how it should have been done), there may also be a Rich Text Format (.rft) document which will contain changes to the software after the manual was printed. If available be sure to read this file. You can load it in most word processing programs (such as MS Word) or even view it in the report generator included with WinEx Pro.

The purpose of this manual is two-fold: First, and most important, is to serve as a starting point to familiarize yourself with how to complete your takeoffs as accurately and easily as possible and second, for reference later as needed.

2.0 WinEx and WinEx Pro Differences

The WinEx Pro version includes all the functionality of WinEx and, in addition, consists of advanced routines as follows.

- On Screen (Digitizer-less) takeoffs
- Direct Import of DXF file data
- Grid staking reports for field activities
- Strata and Core Sample inputs
- Trench work
- Multiple proposed Layers (phases)
- Strata Cut Maps
- Subgrade Material Map
- Import / Export data to and from Data Collection Devices
- Formatted reporting capabilities to clearly indicate site requirements
- Data accumulator for combining multiple takeoffs into a single report

3.0 SYSTEM REQUIREMENTS:

Roctek programs require very modest system requirements. Current technology and system configurations suitable for newer versions of Windows® operating system are more than adequate to install and run the programs satisfactorily. A high-resolution color graphics monitor is recommended, however, since these products are graphics intensive.

The following minimum requirements are given as a guideline:

- Intel Pentium Chip or Equivalent.
- WINDOWS 98, WINDOWS NT/2000, or XP Pro.
- Disk Drive with minimum of 20 MB of free space.
- CD-ROM Drive
- Functional Serial / USB Port for your digitizer.
- Installed working WinTab driver.
- 128 MB
- SVGA Graphic Card.
- SVGA Color Monitor
- Functional USB Port for the Roctek Security Plug.

4.0 Installing WinEx / WinEx Pro

Install steps

1. Install the appropriate GTCO driver for your digitizer.
2. Connect the digitizer to the PC. If a USB connection is used, there is no need to reboot PC. If a Serial connection is used, then reboot PC before proceeding.
3. Insert the install CD in your CD-ROM drive.
4. If the installation program on CD does not start by itself, Click "Start" then "Run" from the taskbar; In the "Command Line" text box, type "D:\WXPSsetup.exe" or "D:\WXSetup.exe" for WinEx (where D represents your CD ROM Drive; If the drive letter is different, change this accordingly); Click **OK**.
5. Once the installation program starts, answer "Yes" to install to your hard disk.
6. The installation program will prompt you for the drive and directory in which to install WinEx Pro.
7. Click **OK**. (We recommend you choose the default directory)
8. WinEx Pro will then begin installing and copying necessary files to your hard disk
9. Install the appropriate HASP driver. Browse to: Local Disc C:\Roctek, double click and install "HDD32.EXE" and "HASPUSERSETUP.EXE" if included.
10. Connect the security plug to the USB port on your computer.

The installation will create a Program Group. Be sure to review the Readme.txt file for recent changes.

Ensure that the digitizer has power. If using the GTCO Roll-Up style digitizer, touch S01 on the control strip of the digitizer (in the lower left corner). This setting reconfigures your digitizer for WinEx Pro use.

Insert your security plug into your USB port. Call ROCTEK Tech Support to activate your plug (if necessary).

5.0 Starting the Program

When you start the program you should see the opening screen, which contains the version number and license number of the program. After you click OK, you will see the main splash screen for WinEx or WinEx Pro, depending upon the program version you have.

5.1 WinEx Pro Version

On the **File** Menu item, you have choices to start a “New” job or “Open” an existing job”. The “**New**” menu item has 2 sub-menu items to choose starting the job with a digitizer or on screen in mouse mode.

If you choose the Digitizer mode, you will be prompted to proceed with doing takeoffs with a hard copy drawing.

If you choose the on-screen start option, you will have the option to start the on screen mouse-mode job by first importing a DXF file’s data. In this case you will be able to set the scaling and the total work region based upon the data imported from the DXF file.

Note that in On Screen (Mouse) Mode or in Digitizer Mode, you can import DXF data at any time during the takeoff process. In all cases, however, remember that all proposed work must be within the Total Work Region. The program will allow you to re-define the boundary of the Total Work Region.

5.2 WinEx Version

On the **File** Menu item, you have choices to start a “New” job or “Open” an existing job”. WinEx always works in Digitizer Mode so there are no further choices.


NOTE: This manual assumes the user is using a GTCO style rollup digitizer or cursor, you may need to consult ROCTEK for additional support.

6.0 How to Use WinEx / WinEx Pro

The WinEx Pro version allows you to do takeoff jobs in either an **On Screen Mode** or **Digitizer Mode**. In either you will be able to import DXF data at any time.

The digitizer will operate as both a mouse and a measuring device in WinEx and WinExPro. You can use the stylus (or Cursor) as the mouse to choose functions from the Windows menu options as well as the pointing device to trace items when measuring. The default mode for the stylus is mouse mode; WinEx Pro automatically switches the stylus to measure mode by depressing the button on the side of the stylus while holding the tip of the stylus +/- 1/8” from the mat surface.

To perform any step, simply move the pointer over the appropriate text box and depress the stylus pen down (this option works like the left mouse click). After making your initial choice, you can move the mouse pointer over any icon to see the feature use displayed above the drawing area. To learn more about a particular feature, you can use the help pointer or traditional help.

To use the help pointer, click on the  icon and then touch any other icon. You will be taken directly to help for the particular feature.

When you start a job in **Digitizer Mode** the stylus is in the mouse mode. This means that as you move the stylus around on the digitizer you will see the mouse pointer (arrow) move around correspondingly on the screen. Depressing the stylus will have the same effect as depressing the left button on the mouse, allowing you to choose a particular option from the menu. It is important to realize that this ability is applicable to all Windows programs, not just WinEx Pro. You can use your digitizer instead of your mouse in everyday use, if you wish.

Once an input option has been chosen (Topo for example), WinEx Pro automatically changes to the measuring mode so that you can trace in your input. In order to finish an input you must depress the lower side button on the stylus (without actually touching the stylus down on the digitizer pad) which switches the program back to mouse mode and then touch either the minus or plus icons to enter more of this entry type or Finish (where the cursor will return automatically).

The digitizer will only be in the measuring mode after you have chosen one of the input options (topo, connected spots, unchanged area, work region, etc.) or a measurement (area, length, count, etc.). You may switch out of the measuring mode during a measurement by depressing the lower side button which will allow you to utilize the additional speed bar/menu options such as change color. To return to measure mode, touch the red down arrow icon on the speed bar.

7.0 User Interface and Functions

7.1 File Menu

7.1.1 New: Starting a new takeoff

The file > New command will start a new takeoff job. You will be prompted to save changes to the current job before starting a new one.

If you are running WinEx Pro, you will have the option to start a job in the **On Screen Mode** or the **Digitizer Mode**. In the On Screen, mouse-mode, you have a further option to start the job by first importing a DXF file and then setting your scale and defining the total work region, based on the imported data. Note that you will be able to import DXF data in either of the 2 modes, at any time during the takeoffs for the job. You will be prompted to set scale and the Total Work Region for the job depending upon the startup option you choose.

In the digitizer mode, you must first set a Scale and select two reference points for the job. After completing this step, you may then enter a description for the job (maximum of 40 characters). Next, trace around the perimeter of your work area to define the Total Work Region. This area should include all the areas of change on the job, but try and keep the area as limited as possible. This is important because WinEx Pro will automatically establish a work region inside the perimeter you trace. The area specified will become sectioned off and computed. Areas outside this perimeter will be excluded from the calculations. A smaller area will allow for a finer grid and in turn permit more accurate calculations.

Note: Please take a moment to verify that you have correctly defined your limits of work to include all PROPOSED areas requiring change. Existing Topos are permitted outside this Start-up work region. Cut and Fill quantities will only be calculated within the Total Work Region.

After you have traced the area, touch the side stylus button to return to mouse mode. Now touch the mouse pointer over the "Finish" command on the taskbar.

Now you will be at an option menu. You may select a limited elevation job (maximum of 320ft of elevation change) or an unlimited elevation job. In most cases the limited method will work and it will consume less memory to do so.

Additionally, you may specify a size for each of your cells in both the vertical and horizontal directions. WinEx Pro will display the saved default grid size and the actual number of cells used in the direction specified for this job. The more cells used will slow processing of the job and will also require more RAM memory. This grid size is changeable after the job has been entered through the Edit Input option located in the Options menu "Change Job Settings". You may save a new default grid size by checking the option on, and you can toggle on/off the vertical/horizontal size matching.

WinEx Pro can work with a grid density of up to 1000 columns by 1000 rows of cells. What this means is that you can layout a grid of cells that has up to 1000 columns of individual grid cells with up to 1000 rows in each column allowing for up to one million separate cell calculations of cut or fill over the site.

For example, if our job site was 1000 feet by 1000 feet and we set our grid cell size so each individual cell was one foot square, how many one foot square cells would it take to cover our job site? Well, if the job is 1000 feet from left to right then it would take one row of 1000 one-foot square cells to cover it. If the job site was 1000 feet from bottom to top, then it would take a column of 1000 cells, each one-foot square, to cover it. This 1000 cell by 1000 cell grid would use one million (1000 squared) separate cells of calculation.

If we were to double the size of the grid cell itself to a square 2 feet by 2 feet, covering 4 square feet it would take 500 columns of 2 ft cells to cover 1000 feet left to right and 500 rows of 2 ft cells to cover the 1000 feet bottom to top. This would yield a 500 by 500 grid, using 250,000 cells of calculation (500 squared).

We recommend that you work with a grid density no less than 200 cells by 200 cells (preferably more) and you can adjust the physical size of the grid cell (in feet or meters) in order to maintain a minimum grid density of approximately 200 rows by 200 columns. A 200 by 200 grid would yield 40,000 cells when calculated. You have probably noticed that as the physical size of a grid cell shrinks in feet or meters, the grid density increases. It takes more little tiles to cover a given area than it does big tiles. The reverse also applies as the site size of the grid cells grow, the fewer of them it will take to cover your site and your grid density will decrease.

If you have any questions regarding how to choose an appropriate grid density for a particular project, you can always call our technical support line for advice.

The next required region setting to adjust is elevation checking. Click on the Tab button and enter in the minimum and maximum elevations for this job as found on the various topographical elements of the blueprint.

Orientation settings: This enables the user to indicate where true north exists on the blueprint. You have four options in which to indicate North. First "Straight Up", this simply means that true North is the top of the drawing and South is the bottom. The second method is to indicate north from reference points. These reference points must have northing and easting coordinates. The user will touch two points and indicate how many feet North and East these two points are of an established reference point. WinEx Pro will calculate North from the relationship of these two points. The third method is to digitize a plan marker. If you have a North marker on your print that does not point straight up and you do not have reference points with Northings and Eastings, you can indicate North from the marker (arrow) printed on the drawing. Simply touch the southern

tip of the marker and then the northern tip and WinEx Pro will calculate true North from that. The last method of indicating North is to provide to WinEx Pro the angle in degrees that North exist off horizontal.

The last region setting is the "Region Setting Tab". This allows you to specify an existing topsoil stripping depth for the entire region, a proposed sub grade thickness and expansion/compaction factors for your native material.

7.1.2 Open: Retrieving a saved takeoff

The file: Open command will load a previously saved takeoff job. You will be prompted to save changes to the current job before opening a new one.

7.1.3 Save: Saving the takeoff to disk

The file: Save command will save the current takeoff job to the disk. If the takeoff has not been saved before and given a name, the Save dialog box will appear and you can enter a name to save the job under.

7.1.4 Save as: Saving the takeoff to disk

The File: Save as command will save the current takeoff job to the disk and allows you to enter a different name if desired.

7.1.5 Print: Print the Takeoff

The file: Print command will print the current job to the printer. Adjust the settings for your printer (**landscape mode will usually work best**) and press OK to print.

You may print the WinEx Pro Answer or Graphics. The graphic representations available on screen may be generated in color or black & white on supported printers or plotters.

To create an ASCII text file of your measured quantities, use a Generic Printer set to FILE rather than an LPT port.

7.1.6 Print Setup: Selecting a printer

The File: Printer Setup command is used to select the printer type and settings for the next printout.

7.1.7 Exit: Exiting WinEx Pro

The file: Exit command will end the WinEx Pro program. You will be prompted to save changes to the current job before exiting.

7.2 Input Topo Lines

The Input Topo feature is designed for entering in contours from the plans. You may enter in existing or proposed (final) contours.

Enter in the elevation for the topo line and then digitize the path of the line. You may trace the line by holding the stylus/cursor down or you may touch points where the line changes directions

only. WinEx Pro will automatically connect the points with straight segments in this case. You may also combine the two techniques discussed.

When you are done entering the topo, touch the side button of the stylus (repeat if necessary) until WinEx Pro switches from Measure mode (the cross hair) to mouse mode (the mouse pointer will move). To do another contour at the current **increment** difference, touch the **"NEXT"** button. To select a new elevation, select the **"NEW"** button. To continue tracing a contour at the same elevation that has a break between, touch the **"PLUS"** icon.

7.3 Input Connected Spot Elevation (Classic Method)

The Input Connected Spot Elevation feature is designed for entering in the spot elevation from the plans. (See New Method below). You may enter in the existing or proposed (final) contours. This feature is designed to accurately reflect slopes from individual points on the plans. As such WinEx Pro will expect you to enter in at least two points at a time, showing a path to follow for the slope between the two points.

Enter the elevation for the spot and touch its location on the plan. Next enter the second point's elevation and touch its location on the plans. If there is an even slope between the two points indicated, touch OK and WinEx Pro will automatically connect a path between the points. If you desire to trace between the two points, click on the Trace Path button in the elevation box of the second point. Now trace a path from the first point to the second (you may touch "Finish" to enter a straight line between the points). This tracing of the path is useful for indicating a path between points that is not straight, such as between points along the edge of a parking lot.

To finish this group of spot elevations, touch the "Finish" on the toolbar without touching a new point.

Note: If you are dealing with a blueprint where a portion of the elevation information is simply a grid of spot elevations, simply use the **Connected Spot** elevation option to enter the data. You can "connect-the-dots" with the various spot elevations until your screen looks like a spider's web, with each of the elevation spots connected to the spots around them.

7.4 Connected Spot Elevations – NEW Method

This new method for entering connected spots simplifies entering the Connected Spot Elevations. You can enter the elevations at any locations, along a traced path, and in any order. You can also select and edit single elevation points later. (The old method is retained for backward compatibility).

Select **"Connected Spots – New"** from input menu or click on the speed-button for this function. Digitize the points either as point-locations or trace along a path as needed. Then click **Finish**. The cursor is now locked along the path entered and you can click at any location and enter the corresponding elevations. Make sure you enter the elevations at the end-points of the trace, or the program will calculate a gradient to the end points based upon other elevations entered. Once you have entered all the required elevations, click on **Finish**.

The new method allows you to edit elevations in Error Corection. Select the Edit option and either click on the Connected Spot Elevations item to edit, or scroll thru the items using the forward and reverse red arrow buttons until you see the item flash. Click on the specific individual elevation point you wish to edit. That point will be highlighted as a large red block. Now click on the

Elevation edit Icon on the tool-bar. You will be prompted to edit/re-enter the spot elevation. Edit all necessary points in this manner and click on **Finish** when done.

7.5 Input Flat Pad

The Flat Pad input allows you to specify any area as being at a fixed elevation. This is useful for building pads and other areas, particularly when these areas are adjacent to one another. You can provide a description for the area and WinEx Pro automatically creates a “Work Region” for the area. You may define unique attributes such as materials to be imported. In addition, WinEx Pro will automatically give independent quantities for the pad region.

7.6 Input Wall Routine – Classic

The Wall routine is designed to give the user the ability to create a vertical wall in WinEx Pro. The wall can be on either a proposed or existing surface and works in a similar fashion to the connected spot routine.

The main difference being, we need to input two elevations at every point, instead of just one. The two elevations at each point will indicate the A and B sides of the wall. It does not matter which side you choose for A and which for B, just remain consistent throughout the input of the wall.

Indicate to which surface the wall belongs, then touch the point where the wall begins. Input the elevations for side A and then side B of the wall at that point. If the wall is tapered at the ends, it is possible for side A and side B to have the same elevation (the wall would be of zero height at that point). Next choose the next point along the wall that you have elevations for the earth on both sides.

After you touch that point on the plan, you will be prompted for the elevations of side A and side B. Now you must choose which side you will call A and stick with it. You may also choose to trace the path between the first point and the second point (you will need to do this if the wall does not have a straight line between the last two elevation points).

WinEx Pro will ask you “Which direction is side A on this wall from point 1 to point 2?” Your choices are clockwise or counterclockwise. There is a very easy way to figure this out. Picture the face of a clock. The line that defines the wall so far is a hand on that clock. Your first point of the wall is in the center of the clock, at the hub. The second point on the wall is the other end of that hand on the clock, out by the numbers. If you were to put an arrowhead on the end of the second point of the wall, it would look like the hand of a clock. Now that we have created this mental picture as the line of the wall being a clock hand, we can answer the question of side A’s location. You already have chosen which side is side A, so now just figure out is A on the clockwise or counterclockwise side of the hand of the clock on the clock face.

Continue inputting the various points along the wall. When you are finished, touch on Finish to complete the function. The wall will indicate to WinEx Pro that the earth rises vertically between the elevations specified by the user for grading quantities. This routine is not designed to calculate any of the structure components of the job.

7.7 Input Wall Routine - New

This uses a method that simplifies entering the data points and elevations for a Wall takeoff. This allows entry of elevations along the wall in any order and after the measurement is completed. The ability to identify the two sides of the wall for entry of elevations is also simpler.

To use this feature select “**Input New Wall**” from the input menu or click on the speed button for

this function. Enter the points or trace the path for the wall. You will be prompted to identify a side of the wall that will be designated as Side A. You are now ready to enter the elevations along the path of the wall at any location and in any order. Note that each point will have two elevations – for Side A and Side B. At least one elevation is required on each side for the wall. Please note: the program will grade the elevation along the wall based on your inputs.

The new method allows you to edit elevations in Error Correction. To edit, select the Edit option and either click on the Wall item to edit, or scroll thru the items using the forward and reverse red arrow buttons until you see the item flash. Click on the specific individual elevations point you wish to edit. That point will be highlighted as a large red block. Now click on the Elevation edit icon on the tool-bar. You will be prompted to edit/re-enter the elevations for both side sides of the wall at this point. Edit all necessary points in this manner and click on **Finish** when done.

7.8 Input Trench (*Pro only)

The Trench function is used to calculate the amount of excavation and materials needed to lay pipe, footings, or other items that require a trench.

To input a trench, select Trench from the Input menu or touch the Trench button on the speed-bar and enter a description for the trench run. The Define Trench dialog box will be displayed.

From the Define Trench screen, you may create a trench template, select a predefined template or modify a predefined template. Choose a predefined template from the Trench Name pull-down or enter a name for a new trench. Then modify any of the parameters to match your trench layout, i.e., hinge height, slope, bench width, and bottom width.

Next define the void type for the trench (if the void definition area is not visible, choose View Void Definition or click the Void button at the bottom): circular pipe, simple footing, T-shaped footing, or L-shaped footing and set the values appropriate to that type. Select the input method for the trench elevations: invert, center, or top. Set the surface to cut from and the surface to fill, (existing or proposed).

Next define the fill materials for the trench (if the materials definition area is not visible, choose View Material Definition or click the Material button at the bottom): select a material from the Material Description pull-down boxes, then adjust the thickness, weight and color if necessary. Check the Native box for Material 1 to use native on-site material for top fill.

Check the Auto box for Material 3 (bedding) to have it automatically adjust to the center of the pipe (circular pipe void only.)

To define new material types, choose Define Materials from the menu or the speed-bar. To define pay levels, choose Define Pay Levels from the menu or speed-bar.

When the trench definition is complete, save the template definition to the library (if you want to use it as a basis for other trenches) by choosing “Save to library” and then press the OK button to continue.

You will now be prompted to touch the first trench point. Touch an endpoint of the trench run and enter its elevation (either invert, center, or top, depending on the method chosen in the trench definition.) Now touch the next known elevation point along the trench run and enter its elevation. Continue in this manner until the end of the run has been reached and choose “Finish” to finish. You may also choose (Input/Options/Add) to input additional runs to be added together and then hit “Finish” to finish.

After calculating the answers for the job, the trench values will be displayed in the Detail Report and the Answer Window.

7.9 Import Data Collection Surface (*Pro only)

The Import Data-Collector Surface function can be used to import points from a data-collector device and creates a surface from the points on either the existing or proposed layer. The surface can cover the entire plan, or it can be contained within a specified region.

To import a surface, select Import Data-Collector Surface from the Tools menu (existing or proposed) and enter a description for the surface. A dialog box will be displayed that will let you select the file name to import. Use your data-collector software to create an ASCII text file of the data. The alignment method, the scale of the data and whether the surface should cover the entire plan or be confined within a specific region are the parameters. After choosing the appropriate options, hit OK to continue.

If you chose to align the surface by 2 reference points, you will be prompted to touch the reference points and give their North and East locations. If you chose to align the surface by 1 reference point and North angle, you will be prompted to touch the reference point and give its North and East location, then identify the North direction. If you chose to align the surface by a locator point and angle, you will be prompted to touch a point corresponding to the lower-left corner of the surface data, then enter the angle of rotation. (Some of these values may not be asked for if they have already been entered.)

If you chose to import the data to the entire plan, an outline of the plan will be automatically generated. If you chose to import the data to a specific region, you will now be prompted to trace the region. After tracing out the region, choose "Finish" to finish.

You will now be presented with the Region Options dialog box. Set any values appropriate for this region and hit OK. (This box will appear for both of the coverage options: entire plan or region.)

The data will now be read in and displayed on the plan as a field of + marks. A dialog box will then appear which gives you the option to accept the current alignment or import the data again using different alignment settings. If the data appears to be correct, accept the alignment to finish. Otherwise, select the new alignment type and enter the values as you are prompted for them.

7.10 Input Unchanged Regions

The Input Unchanged Regions feature is designed for specifying areas to remain undisturbed on the site. This feature allows you to trace out any area where you do not wish to have either cut or fill occur. Essentially this feature will map the proposed elevations to be identical to existing in the area specified. Please note that if you designate an area as an "area of no change," the area is not removed from surface area calculations. It is still a part of the job site; it just has no cut or fill. By definition, an "area of no change" will have only existing lines in it, proposed lines indicate that cut or fill is required.

If the existing grade has been stripped, the proposed elevation will match the stripped (lowered) elevation.

WinEx Pro will automatically identify the area outside your original work perimeter as unchanged.

7.11 Define Strata Layers (*Pro only)

The Define Strata Layers option allows the user to identify unique materials from an engineers soils report. Enter a description for a layer with specific ton conversion, expansion, and

compaction factors for the material as a native fill. Each strata material can be deemed suitable for use as native fill. To do this click on the “use as native fill” box when defining the Strata Layer. If you don’t mark the box it will indicate that this particular strata material when cut will be counted as export. Repeat this process until all materials have been defined.

WinEx Pro will not allow materials to “swap” positions, meaning that if you encounter the same material in different orders you will need to create two distinct layers for the strata definition table.

Note: If you wish to process the job without calculating strata, even though you have entered strata, you may do so. Located in the strata definition table in the lower right hand corner, there is a box entitled disable strata. Simply click the box to put a check into it and you will disable the strata from the WinEx Pro’s calculations.

7.12 Input Core Sample (*Pro only)

The Input Core Sample feature allows you to provide strata data for a particular sample. Enter a description for the sample and indicate the core type. Vertical indicates a 90-degree sample and the angled option will allow you to specify any Dip (penetration angle) and Bearing (direction) angle. Most samples will be vertical.

You may click in either the Depth to Top or Thickness box to define strata elevation data. WinEx Pro will automatically compute the other information. The “Unknown” material will be figured for any cuts deeper than specified in your sample.

7.13 Define Work Region

The Define Work Region feature is designed to allow the user to identify unique characteristics for any area on the site. In addition, individual cut/fill and area calculations are available for any work region defined. Each work region can have the following characteristics:

7.14 Topsoil Stripping

Reduces the existing grades by the amount specified when activated. The cut/fill is then computed from the bottom of the stripped thickness and the stripped volume is reported in the Answer Window.

7.15 Proposed Subgrade

This reduces the proposed grades by the amount specified when activated. The cut/fill is then computed from the bottom of Subgrade. Clicking the button next to Materials will activate the select material dialogue box, so you may design a specific materials with an individual thickness. These quantities will be reported in yards and tons in reports.

7.16 Swell

Multiplies the excavated quantity by the factor given to derive the expanded yard quantity. If no swell or expansion of the cut is desired, leave the swell factor at one. An expansion factor of 15% (or .15) would be added the standard setting of 1 to indicate a factor of 1.15 in the “cut swell factor” box. The bank (tight) cut volume is multiplied by 1.15 yielding the expanded cut volume. Another way to think about this is that the cut dirt occupies 115% of the space after excavation as opposed to prior. The expansion factor and expanded yards are reported in the Answer Window.

7.17 Shrink

Divides the filled quantity by the factor given to derive the compacted yards. If no compaction factor is desired, leave the fill shrink factor at 1. A compaction factor of 10% (0.1) would be subtracted from 1 to give us a fill shrink factor of .9. This is what you would type in the “fill shrink factor” box. WinEx Pro will divide the tight fill yards by .9 to yield the volume of fill material required. Another way to think about this is that the fill will be compacted to occupy 90% of its “in the truck” volume. The compaction factor and compacted yards are reported in the Answer Window.

7.18 Calculate Depth to Balance

WinEx Pro will automatically compute the necessary adjustment thickness to balance either the volume of import/export in the specified region or the volume of the entire site within the specified region. This option is useful in cases where you wish to indicate a region to be used as a balance region. You must put a check in the “proposed sub grade” box for these buttons to be available. The job must also be processed (calculator icon). The balance feature balances the tight or neat yards; i.e. balance is calculated prior to shrink or swell.

To create a work region, select the icon from the speed bar. Enter in a description for the work region. Now trace around the perimeter of the region and complete the region by switching back to mouse mode and touch “Finish”. You may choose from the options mentioned above. Click on OK to finish.

You can have an unlimited number of work regions on your job. Use this feature to compute quantities for individual regions and also to define unique attributes. To get the answers for specific regions, pick the “generate all” icon.

Note: Work regions are cumulative where they overlap. So, if you strip 6 inches in region A and six inches in region B, you will strip 12 inches where those regions overlap.

7.19 Length Measurement

The length icon will only be available when the Measure Toolbar has been activated. Otherwise, the feature is available through the Input – Measure (L, A, C, S) menu.

The Length command allows you to measure the length of continuous line segments on the plans. This means that every point touched with the digitizer will connect to the previous point, with no gap between the points. To end one line segment and add or subtract another, use the Add or Subtract measure functions.

To complete the measurement, hold the stylus slightly above the digitizer (keeping it in the proximity of about 1/8” from the surface) and tap the side button on the stylus or toggle button on the digitizer cursor. This will switch the pointer mode from measure back to mouse mode. You will notice that the cursor will reappear above the Finish block. Touch the pen down once to finish this measurement.

Note: If the scale has not been set before executing this function, the Scale function will automatically prompt you for the current scale.

7.20 Measuring an Area

The Area icon will only be available when the Measure Toolbar has been activated. Otherwise, the feature is available through the Input – Measure (L, A, C, S) menu. The Area command allows you to measure the enclosed area and perimeter length of regions on the plans. To end one area and add or subtract another, use the Add or Subtract measure functions.

To complete the measurement, hold the stylus slightly above the digitizer (keeping it in proximity, about 1/8" from the surface) and tap the side button on the stylus or toggle button on the digitizer cursor. This will switch the pointer mode from measure back to mouse mode. You will notice that the cursor will reappear above the Finish block. Touch the pen down once to finish this measurement.

Note: If the scale has not been set before executing this function, the Set Scale function will automatically prompt you for the current scale.

7.21 Counting Units

The Count icon will only be available when the Measure Toolbar has been activated. Otherwise, the feature is available through the Input – Measure (L, A, C, S) menu.

The count Units command allows you to quickly count the number of units of an item on the plans. To end counting of one type of unit and add or subtract another, use the Add or Subtract measure functions.

To complete the measurement, hold the stylus slightly above the digitizer (keeping it in proximity, about 1/8" from the surface) and tap the side button on the stylus or toggle button on the digitizer cursor. This will switch the pointer mode from measure back to mouse mode. You will notice that the cursor will reappear above the Finish block. Touch the pen down once to finish this measurement.

Note: If the scale has not been set before executing this function, the Scale function will automatically prompt you for the current scale.

7.22 Measuring Separate Lengths

The Separate Length icon will only be available when the Measure Toolbar has been activated. Otherwise, the feature is available through the Input – Measure (L, A, C, S) menu.

The Separate Lengths Command allows you to quickly measure the total length of separate straight-line segments on the plans. To end one group of line segments and add or subtract another, use the Add or Subtract measure functions.

To complete the measurement, hold the stylus slightly above the digitizer (keeping it in proximity, about 1/8" from the surface) and tap the side button on the stylus or toggle button on the digitizer cursor. This will switch the pointer mode from measure back to mouse mode. You will notice that the cursor will reappear above the Finish block. Touch the pen down once to finish this measurement.

Note: If the scale has not been set before executing this function, the Scale function will automatically prompt you for the current scale.

7.23 Formulas

This feature allows you to calculate more complex quantities than simple lengths, areas or counts. The formula feature is designed to allow you to apply an equation to a basic measurement and generate numerous answers based upon user entered variables.

There are several options available within the formula option:

Run: Runs the highlighted formula.

New: Creates a new formula and adds it to a permanent alphabetized library.

Edit: Allows you to edit an existing formula.

Delete: Allows you to delete an existing formula and all attached formulas.

OK: Exits the formula menu.

To create a new formula:

- Touch the icon
- Touch "New" from the formula screen.
- Enter the formula name.
- You will now see the formula definition screen.
- Pick the base measurement for your formula (length, area etc.) by selecting it from the pull down menu in the upper left-hand corner of the screen.
- Select the measurement value to base your formula on by double clicking the appropriate answer or highlight the answer a click "Use" (you will notice it appear in the equation definition block at the top of the screen).
- To add variables, touch Add at the bottom of the screen (Entered Variables).
- Enter the name of your variable (a short name.)
- Enter the prompt to display when asking for the variable (as short as possible.)
- Enter the default value for the variable (the most likely answer.)
- Add additional variables and constants as needed.
- Using the keypad on the right side of the screen, create your equation (the equation definition block at the top will display the information generated) using the Measurement Values, Variables, Constants, numeric values and the equation operators: (+, -, *, /)
- Enter the appropriate units for the formula answer by pulling down a value from the Units heading (you may also manually enter any text.)
- Click OK to save.

You may create a formula that generates numerous answers from one measurement and a common set of variables. An example of this would be a formula to compute both volume and square footage of a wall from a length and variable height & thickness. To add additional answers to a common formula, click the Add button under the "Attached Formulas" heading in the upper right portion of the definition screen. Repeat the above steps to add a new equation to the existing formula.

Note: If the scale has not been set before executing this function, the Scale function will automatically prompt you for the current scale.

7.24 Scale Menu

The Scale command allows you to set the measurement scale and units of measure (English or Metric) for the current plan. This function is called automatically when a job is started (or in Quick Measure mode and a measurement is started and the scale has not yet been set.)

Changing the scale on a job with existing data will cause WinEx Pro to recalculate all measured quantities in the new scale.

You may adjust your scale to equal a known distance on the plans by turning the “adjust scale” option on. This option is recommended on any reduced size plan or reproduced plans, as these plans often are not exactly to scale.

After the scale has been set for the first time, you will be prompted for Reference Points.

7.25 Other Menus and Icons

7.25.1 Next Elevation

Next Elevation is available in the Topo Input option to allow for entry of a contour at the present interval. This interval is determined by comparing the last two elevations and uses the difference as an assumption.

7.25.2 New Elevation

New Elevation is available in the Topo Input option to allow for entry of a different elevation than the interval value.

7.25.3 Add Sub-Unit

The Add Sub-Unit function serves two purposes. The first purpose is to act as a toggle to allow you to complete an elevation entry and create a break in the topo line to continue tracing the same elevation elsewhere. When done touching/tracing the initial input entry, touch the side stylus button to toggle into mouse mode (see also using the digitizer as a mouse pointer and, How to use WinEx Pro). Next move the cursor over to the plus icon and touch the pointer down. After completing the step, you will be returned to measure mode. Repeat as often as needed.

The second purpose of this feature is to allow you to accumulate two areas that are not contiguous. This is useful when defining areas for work regions and also with the Formula feature. After measuring the first quantity by tapping the side stylus button to return to mouse mode, move the pointer over the “Add Sub-Unit” button and then depressing the tip down. When measuring areas, the accumulated total will give a total of all added areas and the perimeter will include all measured perimeters.

When all of the items have been measured, choose “Finish” to calculate the total.

7.25.4 Subtract Measurement

While measuring an item, the Measure: Subtract function allows you to end one measurement and begin subtracting another. Access this option after measuring the first quantity by tapping the side stylus button to return to mouse mode. Move the pointer over the red minus key and then depress the tip down.

This feature is very useful when indicating voids for areas, Work Regions and other functions. When measuring areas, the accumulated total will give a net area of the added quantity less the subtracted quantity. The perimeter will be the total of all perimeters. When all of the items have been measured, choose “Finish” to calculate the total.

7.25.5 Close Input

Use the Close Input feature to connect your final point of entry to your first entry point in input functions like Topo or spot Elevation, which do not require an entry to close.

7.25.6 Erase Point/Measure

While measuring an item, the Measure: Erase Point/Measure function will remove the previous point touched. Continue to use this function to erase all incorrect points. If a measurement is not in progress, this command will erase the last measurement function.

Note: the BACKSPACE key on the keyboard can be used for this function also.

7.26 Resume Measurement

The Measure: Resume command is used to return to measurement mode after entering mouse mode (pressing the side button during measurement.) This can also be accomplished by pressing the side button again while the cursor is inside the measuring window.

7.27 Cancel Measurement

The Measure: Cancel command is used to cancel the current measurement and remove any points associated with it. You can also cancel a measurement by pressing the ESC key.

7.28 Finish

Finish command is used to complete a measurement and display the results. Selecting this option will complete the current calculation. No further Adds or Subtracts will be available for this particular measurement. Note: The "F" key on the keyboard can be used for this function also.

7.29 Edit Items

In the Edit mode, use the digitizer to touch a digitized entry item for correction. You can also cycle through the items selection in order by using the Left and Right arrow edit buttons. When the desired entry flashes on the screen, you can select the property of the item to edit.

You can also select multiple entries for editing simultaneously.

7.30 The Results Window

The WinEx Pro results are shown in the Answer Window had been redesigned in version 5.0 and now includes enhanced configuration options and the ability to transfer numbers to Excel directly from the WinEx Pro Speed bar icon or, from the Answer Window itself.

The Transfer configuration screen (see below) is reached via the icon, on the Answer Window toolbar, with the tools on it. Items can be selected individually from the answer window and transferred to any “open” spreadsheet or estimating program.

If Excel is opened directly from the WinEx Toolbar, using the Excel Icon, all the answers in the answer window will be exported immediately to the opening Excel worksheet.

The Measure: Show/Hide Answer Window command is used to view or hide the answer and entry windows. The answer window will stay on top of all other windows, allowing quick transfer of numbers to other programs.

If the window is in the way, hide it by choosing the Show/Hide Answer Window command or choosing Close from the answer window system menu (or double-click the system menu box).

| | A | B | C |
|----|-----------------------------|--------------|-----------------|
| 49 | cut volume (bank) | 219.69 | yd ³ |
| 50 | cut area (cell) | 3456.00 | ft ² |
| 51 | fill volume (bank) | 0.00 | yd ³ |
| 52 | fill area (cell) | 0.00 | ft ² |
| 53 | Asphalt: material thickness | 6.00 | in |
| 54 | Asphalt: material volume (| 62.95 | yd ³ |
| 55 | Asphalt: material weight | 503.58 | tons |
| 56 | total subgrade depth | 6.00 | in |
| 57 | total subgrade volume | 62.95 | yd ³ |
| 58 | total area (proposed surfa | 3399.14 | ft ² |
| 59 | total area (existing surfac | 3399.94 | ft ² |
| 60 | total area (cell) | 3456.00 | ft ² |
| 61 | total area (measured) | 3375.91 | ft ² |
| 62 | | | |
| 63 | WORK REGION: Parking | | |
| 64 | Description | Value | Units |
| 65 | export volume (bank) | 0.00 | yd ³ |
| 66 | import volume (bank) | 736.14 | yd ³ |
| 67 | cut volume (bank) | 443.41 | yd ³ |
| 68 | cut area (cell) | 6260.00 | ft ² |

To temporarily hide the window when the WinEx Pro window is not visible, minimize the answer window by pressing the minimize button. To restore the answer window double-click on it.

7.31 Zoom Features

7.31.1 Zoom In

Enlarges the screen by a percentage set in the Configure View screen.

7.31.2 Zoom Out

Shrinks the screen by percentage set in the Configure View screen.

7.31.3 Zoom to Area

Allows the user to digitize a frame to zoom the image around. Touch a point in the upper left and lower right of the area to be seen.

7.31.4 Zoom to Last Area

Zooms to the last area specified

7.31.5 Zoom Off

Restores the maximum view of the image. Zoom off also acts as a redraw in WinEx Pro.

7.32 Image Pan Views

7.32.1 Pan Left

Rotates or Pans the Image depending on the mode. If your 3D indicator in the upper right corner of the screen says "off", your image will shift when using the button. Otherwise, the indicator will show "Rotate" or "Pan". This key works in parallel with the keyboard key of the same image (be sure that "Num Lock" is off. The icon toggles between rotate and pan modes.

7.32.2 Pan Right

Rotates or Pans the image right. For more information see Pan Left.

7.32.3 Pan Up

Tilts or Pans the image upward. For more information see Pan Left.

7.32.4 Pan Down

Tilts or Pans the image downward. For more information see Pan Left.

7.32.5 Rotate Up (X-axis)

Rotates the 3-D view up by the rotation increment set in Configure View.

7.32.6 Rotate Down (X-axis)

Rotates the 3-D view down by the rotation increment set in Configure View.

7.32.7 Rotate Left (Y-axis)

Rotates the 3-D view left by the rotation increment set in Configure View.

7.32.8 Rotate Right (Y-axis)

Rotates the 3-D view left by the rotation increment set in Configure View.

7.33 Configure View

Allows the user to specify increments for change in the aforementioned display features and displays the current view information. Rotation, tilt, and center elevation may be manually set in the appropriate boxes. We do not recommend "playing" with any of these options, the exception being "elevation magnification". Increasing this number increases the vertical exaggeration of the site in 3D view. This can be very useful in creating the right "look" for a particularly flat site.

7.34 View Options

Allows you to select the viewable information displayed on screen. You may turn on or off existing or proposed strata and, other data from the display by checking the appropriate boxes. You can select a grid density to display when viewing the grid which is very useful when looking at surfaces. The percentage indicated is the total cells used in the calculation, so the higher the percentage the higher the resolution on the screen.

Additionally, you can see the existing or proposed surfaces by selecting their grid lines to be on. You can turn the cut/fill display on for either surface and you may turn on or off the automatic topo line, spot elevation trench and wall marking.

You may activate the Grid Staking report after clicking the icon. You can set the following options:

- Cells per column (WinEx Pro displays column width in feet)
- Cells per Row (WinEx Pro displays column width in feet)
- Display Font
- Auto Size with Minimum/Maximum point size
- Display Value for:
 - Block Average-Computes average elevations and thickness for entire block
 - Upper Left Corner-Displays actual elevation and thickness for corner
 - Upper Right Corner-Displays actual elevation and thickness for corner
 - Lower Left Corner-Displays actual elevation and thickness for corner
 - Lower Right Corner-Displays actual elevation and thickness for corner

7.34.1 Display Grid

The Display button toggles on the proposed grid over the Input information. This option is very useful when lining up differing entries of data (allowing you to avoid entering conflicting data). The display grid is available in both 2D and 3D.

7.34.2 Display Cut/Fill Map

The Display Cut/Fill Map command will display a multi colored shaded map indicating the areas of cut (red to yellow) and fill (green to blue) on the proposed surface. This map is useful in determining where the cut/fill occurs and as a "sanity check" because it easily displays the cut/fill areas.

The cut/fill map can be used in conjunction with the Grid Staking Report. In this way, you can easily audit elevations that WinEx Pro has derived to ensure that you agree with the interpolations performed. Often, you can identify incorrect entries or missing data that is needed to accurately reflect the sites true condition. Additionally, you can use the Display Elevation feature to audit elevations.

The cut/fill map is available in both 2D and 3D displays.

The cut/fill map can be easily printed out to a Windows supported printer and the color output is very impressive. We recommend you print in landscape mode, you will be happier with the results.

7.34.3 Display Cross Section

The Display Cross Section speed button generates a two point cross anywhere on site. This is a fast method of viewing sections. Vertical & horizontal sections may also be displayed through the

View: Cross section feature and sections may be saved and redisplayed through the same option.

The cross sections can be printed out to any Windows supported printer.

7.34.4 Display Elevation

The Display Elevation option will display the existing and proposed elevations for any cell on the site. In addition, the cut/fill depth for the cell will be displayed. This option is especially useful for auditing work because it allows you to see specifically what WinEx Pro has computed for a cell. By using this feature to check known points on your plan you can find potential errors that need to be corrected.

7.35 Configure Options

In WinEx Pro there are options that are made available to you as the user. To select the options screen go to the top of your screen where it says options, then go down to configure and select. A dialog box will appear and there will be a couple of buttons i.e., configure transfer characters, edit materials library and define trench pay levels.

The transfer characters is used when you are dumping your quantities into a spreadsheet. This feature enables the user to add or delete a tab, return, backspace and linefeed when transferring the quantities into a spreadsheet or estimating system. This may be helpful in customizing the way WinEx Pro interfaces with your spreadsheet.

The material library is the common library that is used for materials in your sub-grade and strata layers. WinEx Pro has a few materials that are already in the library. You can either add or delete these materials. To modify any or all of these materials, simply click on the box and select on the appropriate icon.

Define trench pay levels are for customers that use pay levels and trenches.

In the “configure WinEx” box there are tabs located at the bottom of the box i.e., general, on/off, back up or report. Here is where we turn on and off selected items such as, color, description, elevation, reference points, scale and symbol. Example, if you do not want to have WinEx Pro ask you what the elevation, description, color etc. of a contour line every time you use that feature, then uncheck the box. If you do, then check the box. WinEx Pro will ask you initially what the description is, but after that information is entered it will not ask again.

Next is sound. This is for your digitizer. When you press or depress the tip of the stylus on the digitizer pad, do you want it to beep? Check or uncheck the box accordingly.

The backup tab needs little explanation because if you want WinEx Pro to back up (save to the hard drive) every few minutes, then enable the auto backup feature and put an interval in for the program to backup your job. If you do not wish WinEx Pro to automatically backup your work, uncheck the “enable auto backup box” and put a zero in the box. Warning, by not enabling the auto backup feature you will be operating the software with no safety net.

The report tab determines what output you want to see. If you want the detailed report, select it. There are detailed report defaults listed. If you do not want a trench report, then uncheck the box and the report will not display a trench portion of the report. If you are transferring quantities into a spreadsheet, then select the answer window option. After the job has been processed an answer window will appear. If you are using a spreadsheet, then open the spreadsheet and keep it in the background while the WinEx Pro answer window is in the foreground. Once the quantities are highlighted in the answer window, that number is automatically copied to the windows clipboard.

This means that you may just simply select the cell or column of your choice and paste the desired number. The end result of WinEx pro is the quantities, so you have one of two choices to get your numbers. WinEx Pro either displays a detailed report or the answer window.

7.36 Changing Reference Points

Reference points are a very important part of WinEx Pro. Reference points act as a guide for WinEx Pro. They serve as a point of reference for the software and digitizer alignment. Reference points can be deleted and reentered, but this is not recommended. If it is imperative that you delete and reenter the reference points, then select “tools” at the top of your screen. Now a list will appear, select “change reference points”. After selecting, WinEx Pro will ask you for reference points one and two. This is not used to move your plan on the digitizer. By doing this you are physically removing the reference points only and relocating them on the plan.

Furthermore, in the “tools” menu the user is able to align the reference points. This option could also be known as move drawing on the digitizer using the same reference points on the plan. This is used to relocate the drawing on the digitizer without exiting WinEx Pro and opening it back up. We have had a couple of users that have preformed this operation and have not been able to relocate the plan, so it fits back on the digitizer. It’s very difficult to talk a person through the process of getting the full sheet back to its original position over the phone. We have told a few customers that they will need to delete and reenter the drawing because of the “align reference points” option. Roctek recommends that the user know what he/she is doing prior to modifying the reference points. Call Roctek support for further explanation (800) 826-7763.

7.37 Detailed Report Screen

The WinEx Pro Detail Report is designed with a detailed analysis of quantities on the site. It is generated choosing the Generate/Answers/or pressing the All Work Regions Cut/Fill icon.

The report will generate answers for every region on the site and all imported materials by default. Depending on the speed of your computer, this may take a while to calculate, so be patient. When complete, the report will consist of the following details:

Comprehensive Quantities for the Job
The basis of calculations consisting of:

- Site adjustments
- Existing dropped by stripping thickness
- Volume stripped (Not Included in cut/fill calculations)
- Proposed dropped by over-excavation for structures

Site Area in square feet and acres

- Total Area on Plan View
- Total Existing Surface Area (includes undulations)
- Total Proposed Surface Area (includes undulations)

Summary of Job: Provides overviews of cut, fill, export, borrow required, and import
Cut/Fill Breakdown: Provides a detailed analysis of cut/fill in bank yards with:
 Each Strata Material Type
 Adjusted by each independent expansion/compaction factor

Identification of Suitable fill material

In-place yardage requirement (with compaction)
Export by specific material in yards (with expansion)
Export by material in tons (adjusted for expansion)
A summation of cut categories follows Fill analysis subdivided by:
Total bank yards fill
Overall Site compaction (from work region definition screen)
Total yards needed when including compaction
Borrow required (total in-place usable material less #1 above)
Adjusted borrow required (total yards needed less In place yardage cut)
Imported Materials
Total yards and tons
Individual breakdown of each selected material

Individual Work Regions included in above Quantities include calculations only within
work region perimeter
Imported Material Report
Breakdown of all imported materials by type and region
Total selected material in yards and tons
Breakdown of selected material found in every work region

7.37.1 Report Formatting (*Pro only)

You can fully edit and modify the report, which is useful for customizing it for proposals, presentations, etc. Type in any changes you desire and the report can be printed. The Menu commands are standard Windows commands, so it should be fairly self-explanatory. We have tried to provide support for common hot-keys: CTRL-B for Bold, CTRL-I for Italics and so on.

This report is created in a Rich Text Format (RTF). This means that the report can be loaded into most windows based word processors for editing to your specification. The idea was to provide you with a professional formatted report while allowing you to modify the report to the fullest abilities of professional word processors or documentation programs. You can open and work on RTF files with other programs such as MS Word, Corel WordPerfect, Adobe PageMaker, MS Excel, MS WordPad, etc.

You can view specific portions of the WinEx Pro report by clicking on the appropriate check boxes displayed at the bottom of the screen. After doing so, click the Generate button to redisplay the specific report chosen.

The whole report or any portion can be imported or pasted into your spreadsheet (using Windows copy and paste: CTRL-C and CTRL-V).

7.37.2 Accumulating Reports in WinEx Pro (*Pro only)

WinEx Pro supports an "Accumulated Report" feature, which provides a detailed analysis of the combined quantities for multiple sites in a single report. Generating reports for the individual sites and then adding those sites to the Accumulator creates an "Accumulated Report".

First, load an existing takeoff into WinEx Pro and generate a Detail Report for that site (by choosing the Generate/Answers/All Work Regions Cut/Fill menu option or pressing the All Work Regions Cut/Fill icon on the toolbar). After the report has been generated you can add the site to the Accumulator by selecting Accumulator/Add Current Site from the menu in the WinEx Report window. The Accumulator window will then appear and the site will appear in the list on the left side of the window. The site has now been added to the Accumulated Report. To add another site

to the Accumulator, first close the Accumulator window and the WinEx Report window. Select File/New from the menu and load another existing takeoff. Generate a Detail Report for the site and add it to the Accumulator by selecting Accumulator/Add Current Site. You will see both sites listed on the left side of the Accumulator window.

Click on a site in the list to see its details on the right side of the window. These details will show you some of the options that were selected when the report was generated, such as the reporting of pads, materials, trenches or use of metric values. As shown in the Report Settings in the lower-right portion of the Accumulator window, an Accumulated Report can either use the same options as the first (top) site in the list "Use settings from first site in list", or you can manually choose the options "Use these manual settings". You can move a different site to the top of the list by selecting a site in the list and then clicking the "Move to Top" button located beneath the list. If you choose to use manual settings, the settings you choose will not affect any of the individual sites in the Accumulator, but it will only change the options for the Accumulated Report. Close the Accumulator window once you have selected the options you want. You can add any number of plans to the Accumulator using the same methods outlined above.

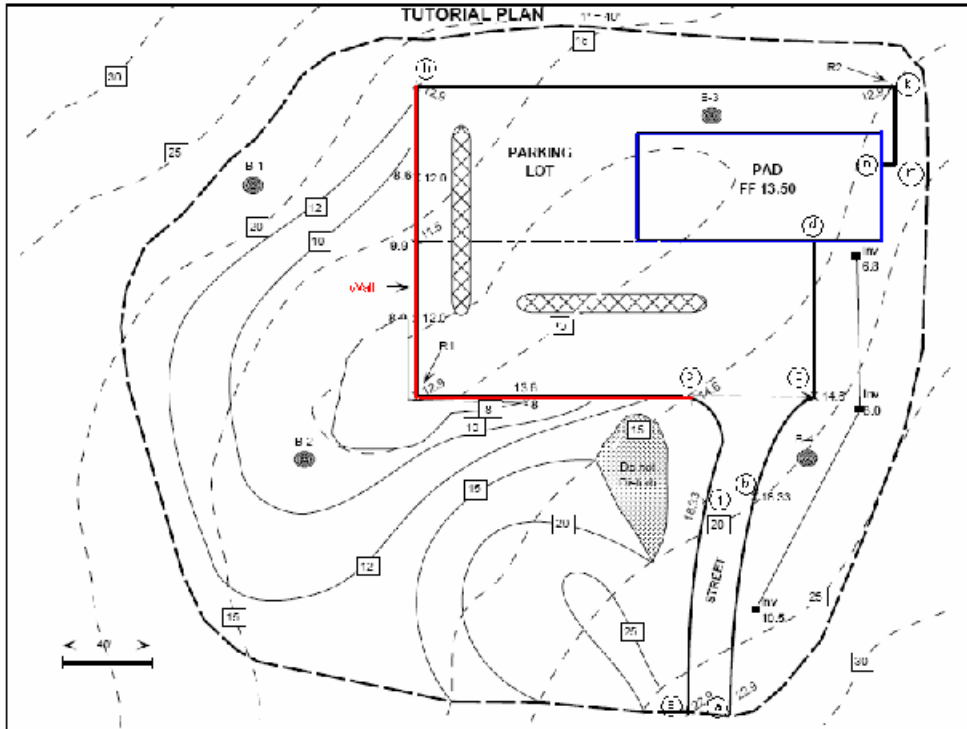
To actually generate and display the Accumulated Report, first you must display a "Detail Report" for an individual site (it does not have to be one of the sites you've added to the accumulator). In the WinEx Pro Report window, select Accumulator/Generate Report in the menu. You will be prompted to confirm that you want to erase the current report because the Accumulated Report will be displayed in the same window in which the individual report is displayed. After selecting "Yes", the Accumulated Report will be generated and displayed. This report can be edited, printed and saved just as with any site report. To display the Accumulator window and make adjustments to the options or to rearrange/remove sites from the Accumulator, select Accumulator/Configure in the menu.

Note that there is currently no way to save the Accumulator options or the list of accumulated sites after closing WinEx Pro. Each time an Accumulated Report is generated you must go through the process outlined above to create detail reports for each site and add them to the Accumulator.

8.0 Tutorial

Take out the sample plan that has been inserted in the manual. This small site will serve as our tutorial. The tutorial is designed to provide you a simple yet complete example of how best to enter in a job. It will only take you 60-90 minutes to complete. After you have entered the job, you can compare your work to the included file in the CD; this will allow you to get a good sense of confidence.

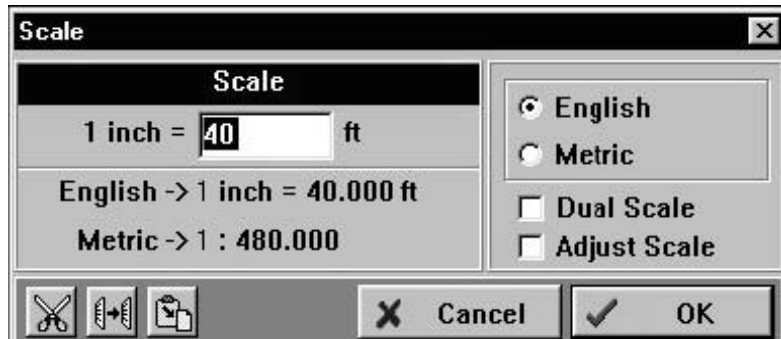
Tape the plan down anywhere on the digitizer. Start up WinEx Pro by double clicking with your stylus (tapping the pen tip down twice quickly in succession) over the WinEx Pro icon in your program group. Next, you will see the WinEx Pro title screen. This screen contains the version and user ID numbers (which you will need to receive Tech Support). Proceed by clicking on the OK button.



8.1 Scales

Now you will see the WinEx Pro startup dialog box. This box is somewhat self-descriptive; to start a new job, click on NEW. WinEx Pro will first ask you to provide a scale.

The scale for this job is 1" = 40', so move your mouse pointer over the numeric field in the box.



Click the stylus (which controls the mouse pointer) down anywhere in the white space.

You will now see a numeric keypad which will allow your digitizer cursor to be used as mouse to move to and click the numeric you want. Move the mouse pointer over the 4 and click, followed by the 0. When you have 40 in the entry box, touch OK.

As you return to the scale dialog box, you will also notice that you may work with either English or Metric scales. You can also work with a dual (horizontal different than vertical) as in cross-sections or profiles. In addition you may adjust your scale to equal a dimension on the plan; this option is very useful if you are working with a 1/2 size plan or a reproduction of a plan that does not scale out well. When you have finished entering the scale correctly, click on OK.

Note: If your drawing refers to a scale other than unit inches, convert the number to unit inches.

Eg: 3/16 scale, where three inches on paper equates to 16 feet on site, is equivalent to a scale of 1"=5.33ft. ($1/(3/16)=5.33$).

8.2 Reference Points

Next you need to select two reference points from the plan. These two points are points that you could easily find on the site (they will be used to re-locate the job every time you load it up hereafter). On our site, find the point marked "R1" and touch your stylus down on the plan. Next find the point marked "R2" and touch it. Now enter the job's description: "My sample job, first try".

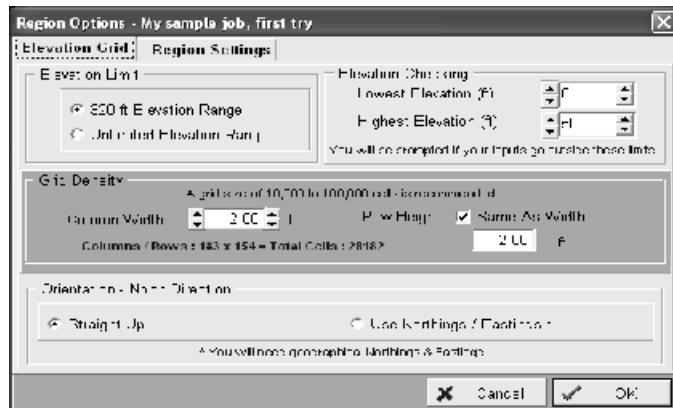
8.3 Total Work Region

After you have completed this step, you will be prompted to trace out the exterior limits of work (what WinEx Pro calls the Total Work Region or Startup Work Region). This is the boundary along which there will be no cut or fill - essentially as close to daylight as you trace out. On this sample plan, this Total Work Region is shown as the heavy dashed line. Touch OK to continue and then trace out around this given perimeter. When you have finished tracing the area, touch the lower side button of the stylus while holding the stylus about 1/8" off the digitizer active surface area. This will switch the cursor to mouse mode. Click on Finish.

NOTE: Cut and Fill quantities will only be calculated within the Total Work Region.

Now you will be looking at the Start-up Work Region's attributes box. Here you can select the grid size for the job, enter in a range of elevations for the job, site orientation, and provide specific attributes such as stripping thickness, shrink and swell values.

To change the grid size, use the arrows provided next to the grid size box. By clicking on the left up arrow, you may increase the cell size by a large increment. By clicking on the right up arrow, you will increase the cell size by a small increment. Set a cell size for the vertical and horizontal cells at 2 foot. See reference section of the manual for a more detailed explanation.



Set the minimum and maximum elevations in the "Elevation Checking" box. Use the arrows to show a minimum elevation of 0 and a maximum of 50 for this job (or click inside the value field to manually enter in a specific elevation from the numeric keypad).

Orientation – North Direction box: Here is where you will set the orientation of the north arrow on your plan. Choose the option that best represents what or where the orientation of the north direction is on your plan. On our tutorial takeoff the north direction is straight up.

Now touch the Tab at the top attribute box labeled "Region Settings". Here we can specify topsoil to be stripped, a "sub grade" allowance for the entire site and also a shrink/swell value. For our

job, we want to strip the top 6" off of the site, so first click on "strip existing". Now enter 6 in the thickness box. There will be no other changes for now, so click OK.

Note: Work regions in WinEx Pro are cumulative. For example, if we strip 6 inches from the total work area and 6 inches on a sub region, then in the sub region area we have striped 12 inches.

8.4 Topographics

Now click on the Topo icon and then choose "Existing". Enter in the first elevation for the job, located in the upper left corner of the plan, at elevation 30. After properly entering the elevation, click OK. You will notice that the mouse pointer now looks like a cross hair, located in the position where the stylus is resting. Press the stylus pen down upon the end of the topo line at elevation 30 and trace along the line while maintaining downward pressure on the stylus. We recommend that your EXISTING topo lines start outside and finish outside of you work region by a little bit, $\frac{1}{4}$ to $\frac{1}{2}$ of an inch. This is for existing topos only.

When you reach the end of the topo, raise the tip of the stylus approximately 1/8" above the plan and touch the lower side button on the stylus. When you successfully switch back to mouse mode, you will notice that your cross hair disappears and that you are controlling the mouse pointer again. Move the pointer over the red plus icon and click to enter in the existing grade contour at elevation 30 in the lower right hand corner (this will "break" the topo so that you don't wind up with a contour running across your site incorrectly). Trace the 30 topo and switch back to mouse mode when done. This time click on the "next" icon to start working on an increment.

Enter in the elevation, at 25. After clicking OK, you will be back in measure mode (the cross hair is there again). Trace in the two lines at 25. After you have entered both 25-foot topos, click the "next" icon again. Notice that the elevation box does not appear again – WinEx Pro has assumed that the next elevation is 20 (based upon the difference between the last two elevations, 30 and 25) and this elevation is indicated in the yellow prompt area of the screen and also in the elevation indicator box in the upper right. Simply trace in the 20 contours and continue using the "next" icon until you have entered the last existing contour at elevation 10. Trace the existing topo lines all the way to the edge of the plan – WinEx Pro needs to figure elevations even out of the work area because these are relevant to the surface of the entire site.

When you are done, return to mouse mode and move the pointer over the "Finish" button on the toolbar of the WinEx Pro screen. Touch the pen tip down to finish entering existing topos. Now touch the topo icon again and this time select proposed (Final) topos and input at elevation 25, 20, and 15 using the techniques described. Now you will notice that the next topo is at a different elevation than the common interval - it is at elevation 12. To provide a new elevation, click on "new" to enter in the 12 elevation. Notice that this contour connects back to itself (as seen often in retention pond), so you can have WinEx Pro close your topo up by touching the Q icon. This will connect your last point to your first point, so start tracing at the beginning of a curve, continuing until you reach the point first point to your last and touch the "close input to first point" icon looks like a red Q). Repeat this process to enter the 10 elevation and then the 8.

NOTE: Proposed topo lines should stay inside of the original startup work region. Only existing topos can extend outside the original startup region.

If you accidentally touch the red NEXT button instead of NEW, you can override the default elevation by touching the elevation indicator in the upper right hand corner and then entering in the correct elevation. When you are completely done with the topos, click on Finish.

8.5 Spot Elevations

Next we need to enter in the spot elevations for this job. One way to think about spot elevations is to consider that there is a known slope between any pair of spot elevations points on the site. Therefore, a spot elevation by itself has no slope and will not produce meaningful results. By indicating a path between any two known elevations, we can very accurately represent the surface along this gradient and therefore make very reliable assessments about the area around the line/path between the two points. WinEx Pro uses this concept with regard to dealing with spot elevations on the site.

The spot elevation feature provides a simple method of adding surface information to the job and in turn WinEx Pro will make more accurate interpolations based upon this information. A connected spot elevation may run between two spot elevations or one spot elevation and a known elevation of a topo line (as the second spot elevation). Often a connected spot elevation is an obvious entry on a site (along the edge of a parking lot for instance), while in others you will need to use your own judgment in determining the need for spot elevations, and the appropriate points to connect. Please read the reference section for further information on entering spot elevation grids.

CLASSIC METHOD

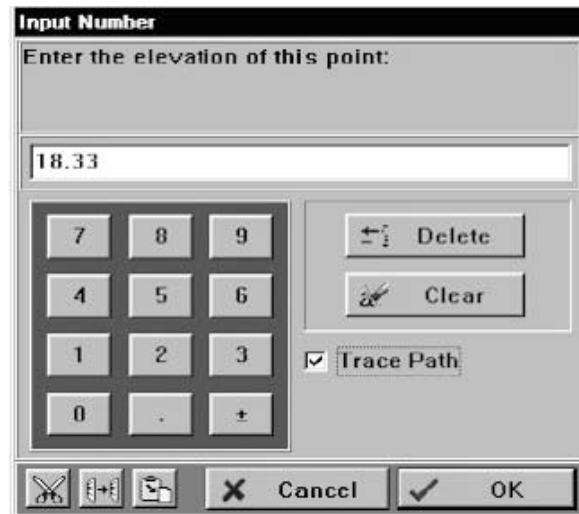
(See New Method below)

From the menu choose “Connected Spots – Classic”. Notice that there are spot elevations indicated at the top edge of the parking lot and along both sides of the street on this plan. Pick “Proposed” as your surface to enter.

Now touch the point indicated as (a) at the bottom of the plan on the right side of the street, where the elevation is shown to be 22.9 ft. Enter this elevation and then touch the point (b) where the elevation is shown to be 18.33 ft.

Make sure that after entering the elevation, check the “Trace Path” check-box, because you need to trace the curve along the edge of the street.

Now Trace along the path from point (a) to (b).



To complete this trace, press on the lower side button of your stylus to switch to mouse mode and click on the “Finish” button on the at the top of the screen (or type “F” on the Keyboard). This indicates to WinEx Pro that the trace between the two points (at 22.9 & 18.33) is done.

Now touch the next elevation point (c) at elevation 14.6 ft and enter the elevation. Again, the path needs to be traced because it is not a straight-line path. So leave the “Trace Path” option checked. Repeat the tracing process and finish by clicking on the "Finish" button.

To enter the last connected spot in this series, touch point where the parking lot meets the pad (d) at elevation 13.5. After entering this elevation UNCHECK the Trace Path option because this is a straight-line connection. Click OK and WinEx Pro will automatically connect these two points with a straight line.

Remember, if you make a mistake in any of these steps, simply erase that portion of the entry by clicking on the “Erase” button on the tool bar, re-enter the data and continue.

At this point, we have finished one series of spot elevations and we need to continue to ADD the series of the spots on the left side of the street. So click ADD button on the tool bar that has the “plus” icon. This will “finish” the first series of entries and start the next.

Now touch the spot indicated as (e) with elevation at 22.9 Ft. Since this is the first point in this series of spots, there is option to connect or trace to this point - you will be prompted to touch the next point instead. Enter the elevation 18.33 at point (f), with the Trace Path option and trace the path to this point. Proceed to enter the elevation 14.6 and trace to point (g). Note that our Vertical wall starts at this point so we need to complete this series of spot entries here and continue at the top left of the parking lot. So click on the “+” icon again to add the next series.

Our last run starts in the upper left corner of the parking lot, point (h) at elevation 12.9. So enter this point, and the next (k) at 12.9 without the Trace Path since it is a straight line connect between these two points. Continue to enter the last point (n) on the right edge of the pad at 13.5, this time with the trace option selected. Trace the path through point (m) by simply touching the corner point (m) and then and then clicking on the finish button to complete the trace to (n).

Click on the “Finish” button once more to end the Connected Spot entries.

NEW METHOD

The new method of entry for Connected Spots is simpler and more direct. It eliminates the need to switch between tracing and straight connections between successive spots of elevations.

If you have chosen this method, simply connect the spots by tracing along or clicking on the spots where you need to define elevations. In this tutorial, start at point (a) and proceed through all successive points up to point (n), by clicking on successive points to make a straight line connection, or trace a curve to the next point. Click on Finish after you reach point (n), in a single pass. Now you will notice that your cursor is “locked” on the traced line of connected spots and you are prompted to click at points along this line to enter their respective elevations. So, move your cursor to each of the points where spot elevations are shown, click and enter the elevations. Click on Finish when done.

8.6 Wall Routine

CLASSIC METHOD

(See New Method below)

Let’s put in the vertical wall that exists on two sides of our parking lot. The wall starts at the point 12.9, 12.9 in the upper left corner of the lot and goes from point (h) to R1 to (g). Remembering what we learnt in the reference portion of the manual, we need to indicate what the elevations of both sides of the wall at this point are 12.9 for A and 12.9 for B. Next we need to indicate the next point along the wall and its associated elevations. Touch the point at 12.0, 8.6 and then enter 12.0 for side A and 8.6 for side B. We have just decided that the “low” side of the wall is side B. WinEx Pro now needs us to indicate which side is side B. Please refer to the reference section for further explanation, but the answer to the clockwise question is that side A exists on the counterclockwise side of the line between the points. We next need to just follow along the wall, inputting the appropriate elevations for the sides of the wall, always remember that we have chosen B as the low side. Continue on picking up the points at 11.5, 9.9 then 12.0, 8 then 12.9, 8 then 13.6, 8 and finally 14.6, 14.6 finish the wall by touching “Finish” button on the toolbar.

New WALL METHOD

The new method for Wall entry is simpler and more direct. You can click or trace through the points that locate the wall in one pass. Then choose a side you designate as side A and enter elevations on both the sides of the wall along it's length.

For entering the Wall in this tutorial job, choose the NEW method and click on points (h), R1 and (g). Click on Finish to end the locating part of the wall. Now you will be prompted to choose a side of the wall as "A". Click on the left side of the wall to designate this as side A. Now you will be prompted to select points along the wall to indicate the elevations on each side of the wall. Note that as you move the cursor it is "locked" along the length of the wall. Go ahead and click at points where elevations are shown for both sides and enter the values, keeping in mind the side that is designated as "A".

When done, click on Finish.

8.7 Pads

Next we need to enter the Pad itself at elevation 13.5. Click on the PAD icon to start the Pad function and type "Building" for the pad description.

Enter in the elevation at 13.5 (the Final grade) and trace the pads perimeter. A pad is by definition an area so WinEx Pro will automatically close your perimeter from the last to first points touched when you touch "Finish".

Region Options - Building

Region Settings

Strip Existing
6 in

Cut Swell Factor
1

Fill Shrink Factor
0.95

Proposed Subgrade
12 in

Materials

Calculate Depth to: Balance Region Balance Site

Cancel OK

After digitizing the area, the Region Options dialog box will appear. Here you can specify unique characteristics of the pad (independent stripping thickness, expansion or compaction, and over excavation for sub grading). In most cases, you will want to show some kind of adjustment for


sub grade depth and that is true here. Click on “Proposed Sub grade” and then click on “Materials”. This will activate the “Define Material Layer” box.

Note: For information on the Balance Region and Balance Site options please see the portion of the tutorial (page 39) or the reference section.


Click on the down arrow to the right of the “Layer #1” text. Here you will see the WinEx Pro materials library items - you can enter in common materials you use and have WinEx Pro automatically track your import requirements, while having the correct adjustments made to get to sub grade elevations. Pick Concrete for your Layer 1.

Next enter 6” as the thickness for the concrete. If you wish to use a color other than the default, click in the box to change. After the concrete has been entered, click on the down arrow for layer 2 and select Crushed Stone. Set this thickness to 6”. Keep the ton conversion factor at 1.5. After these items have been entered, click on the Cancel to finish entering in Materials. You will now see your complete Material Layer list showing you exactly what materials, thickness and conversion factors will be used in the pad area. Click on Ok to finish.

You will notice in the sub grade depth box that WinEx Pro has totaled the thickness and shows the 12” to be removed. Click OK to exit the pad function.

There is an area of the site (near the road and parking lot) which must remain undisturbed.  We can identify this by clicking on the Unchanged Area icon. Trace the area marked on the plan, and then click on “Finish”. This feature marks all proposed grades as the same as existing inside the area to be left undisturbed.

8.8 Strata and Core Samples

Next we need to enter our strata. This job has 4 borings, and the first step in identifying them is to establish a table for the site. To do this, click  to define these materials.

WinEx Pro will bring up the Strata Layer Editor. Highlight the “Layer #1” text and type in “Silty Shale” as the first layer description. Use the TAB button or click in the Ton Conversion Factor box and enter 1.75 as the Cubic Yards to Tons factor. Now enter 1.1 as the expansion factor for this material and leave the compaction for this at 1.0. Check on the “Use as Native Fill” box to allow this material to be used in native requirements.

| # | Layer Description | Color | Tons | Expand | Compact | Nat | ✓ | OK |
|---|-------------------|-------|------|--------|---------|-----|--------------------------|----------------|
| 1 | Topsoil | | 0 | 1 | 1 | N | | |
| 1 | Silty Shale | | 1.75 | 1.1 | 1 | Y | X | Cancel |
| 2 | Clay | | 1.5 | 1.05 | 1 | Y | | Add |
| 3 | Rock | | 2 | 1.3 | 1 | N | | Remove |
| U | Unknown | | - | - | - | - | | Edit |
| | | | | | | | ▲ | Move Up |
| | | | | | | | ▼ | Move Down |
| | | | | | | | <input type="checkbox"/> | Disable Strata |

For the next layer, enter “Clay”. Set the Ton Conversion Factor to 1.5, the expansion factor to 1.05 and the compaction as 1.0. Do not check on the “Use as Native Fill” box as this material is unsuitable (i.e. a “haul-off” material). Now enter “Rock” with a conversion factor of 2.0, expansion of 1.3 and the compaction as 1.0. Check the “Use as Native Fill” box. When complete, click Cancel.

Now that you have completed defining what is under the ground, it’s time to give data from the borings. To do this, touch the “input core sample” icon. Touch the first sample located in the upper left corner of the plan. Enter the description as B-1 and then double click in the “Depth to Top” column at the Silty Shale row. This will bring up the depth dialog box and you can enter depths directly from the engineer’s core sample (as is most frequently provided – alternatively, notice you can also click in the Thickness column if you have this information). Enter 1.2 as the depth. Next you will automatically be prompted for the depth to the top of the clay. Enter 2.4 and then 4.7 for the rock. You will need to enter a depth to the top of unknown – basically the total depth drilled. Enter 15 for this depth.

This entry is necessary because often the sample taken will not be enough for the cuts required on the site. In these cases WinEx Pro will figure a volume of “Unknown” material separate from your bottom-defined layer (rock in our case) because this material may or may not be the same.

When done your table should look like the one below:

| # | Layer Description | Depth to Top | Thickness |
|---|-------------------|--------------|-----------|
| T | Topsoil | 0 | 1.2 |
| 1 | Silty Shale | 1.2 | 1.2 |
| 2 | Clay | 2.4 | 2.3 |
| 3 | Rock | 4.7 | 10.3 |
| U | Unknown | 15 | — |

If your table looks the same as the one above click “OK”. If not edit it to look the same and then click “OK”.

Now you will need to enter the remaining samples, so pick “Enter a core sample at a new location”. Enter in the remaining sample as shown. Boring 4 does not have clay, so you enter the thickness values only for the other strata layers.

After entering all of the samples select “Finish Core Samples”.

The next thing we need to do is to identify our structural areas (we call these areas Work Regions). These areas will require us to grade to sub grade and perhaps you also would like to

get quantities for just a specific region on the site. We can easily do this by clicking on the “Work Region” icon.

Do the street first, so enter “Street” for your region description. Trace around the perimeter of the street area until you only have a straight segment left to connect. Switch back to mouse mode and click “Finish” (WinEx Pro connects automatically). Next you will get the Region Options box. Using the same technique discussed when entering the Pad, click on the sub grade and then the Material boxes. Select Asphalt of 6” and ABC of 8”. Finish defining the region as previously instructed.

Create a new Work Region by clicking on the “ Work Region” icon again. Call this region “Parking” and trace around the perimeter. Notice that there are islands in the parking lot- these areas will need to be excluded (voided) from the region, so after tracing the outer perimeter click the red “minus” icon instead of Finish.

WinEx Pro will now prompt you to trace the area to exclude. Trace around the first island. When done, switch back to mouse mode and click the red “minus” icon again to remove the second island. When complete, click “Finish” and define Asphalt thickness 4” and ABC of 6”. Finish the region previously instructed.

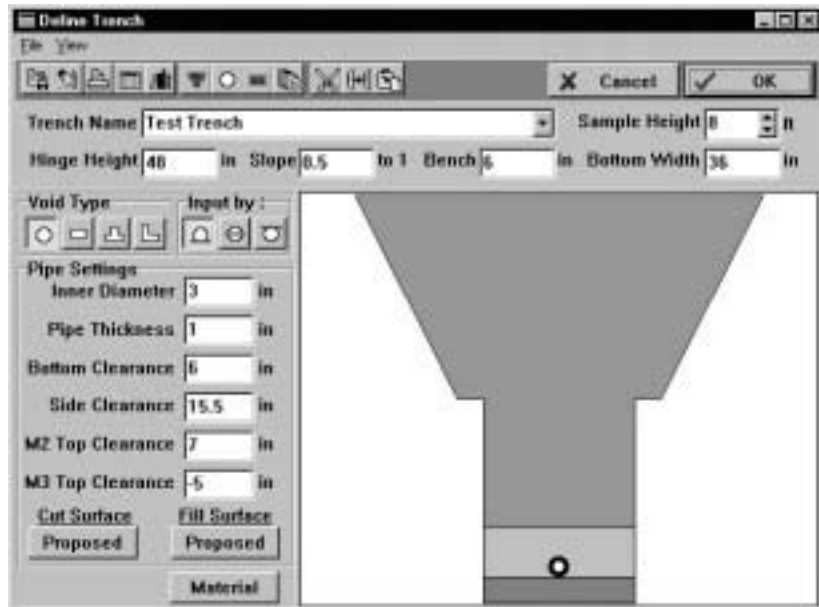
8.9 Trench Work (*Pro only)

Now you are going to insert a trench into your job. Touch the “trench” icon on the tool bar. Confirm the scale (only necessary if you have just loaded the file) and type “Trench 1” for the description and touch OK.

You should now be looking at the Define Trench dialog box with a picture of a sample trench on the right.

If you have saved trenches previously you could select them by touching the down arrow to the right of the Trench Name edit box. Since this is our first time we will start from scratch.

First click in the trench name area and type “Water Main”. The sample height to the right of the name simply changes the height used to draw the trench while we are defining it.



Sample Height has no effect on the actual takeoff quantities and should be set to a value typical for each trench. Click on the up and down arrows in the sample height box (under the OK button) to see the effect on the picture. Our trench will run between 6 and 10 feet deep, so return the sample height to 8 feet for this trench.

The Hinge Height is the distance from the bottom of the trench to the hinge or lay back.

Again feel free to play with the number, observing the effect on the trench. Set it to 48 inches when you are done.

The slope is the rate of run to raise (i.e. the lower the number the steeper the slope). If you wish to have no lay-back, you would set the slope to 0. For our trench the default of 0.5 is fine. Bench is the horizontal distance from the hinge point to the start of the slope. For our trench set it to 0.00 to specify no bench.

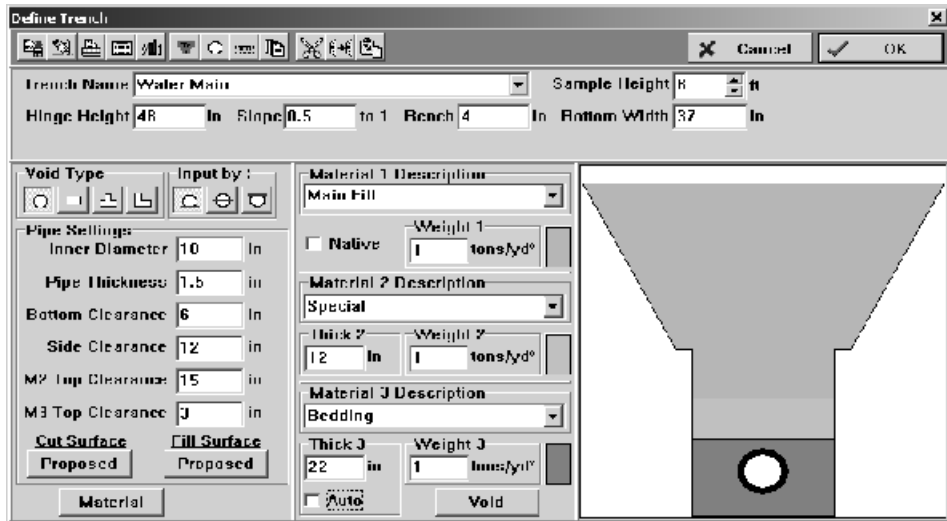
Next we will identify the "Void Type". This feature can be used for pipes or footings. In this example, we will be working with a pipeline (i.e. concrete, steel, etc.). Click on the box under void type that represents a pipe (circle). Next we need to identify how we will input the pipe on the plan. There are three ways to enter the pipe, by invert, middle, or top of pipe. In this case, we will use the invert (default).

Now we are ready to identify the information regarding the pipe in the trench. First lets identify the inner diameter of the pipe. For example, we have a concrete pipe with an inner diameter of 18 inches that is 1.5 inches thick. You will need to click in the box to the right of the inner diameter and enter 18, then click in the box for thickness and enter 1.5. Now we will identify the pipe clearance in relation to the trench. The bottom of the pipe will rest 6 inches from the bottom of the trench and the clearance from the trench wall to the side of the pipe is 12 inches, so lets enter those now. Do this the same way you entered the inner diameter and thickness.

Before we continue, we need to discuss backfill materials briefly, as there are 2 ways to define them by either a clearance or thickness. There is another screen that is used to identify what the backfill material is and how thick it will be, or it can be identified on the current screen you are on by identifying a top clearance for each layer. Top clearance is the distance from the top of the pipe to the top of the material you are working with. This clearance can be a positive number (material above the pipe) or a negative number (material falls below the top of the pipe). At this time we will take a quick look at the materials screen. On the bottom of this screen there is a MATERIAL button. Click on that button now.

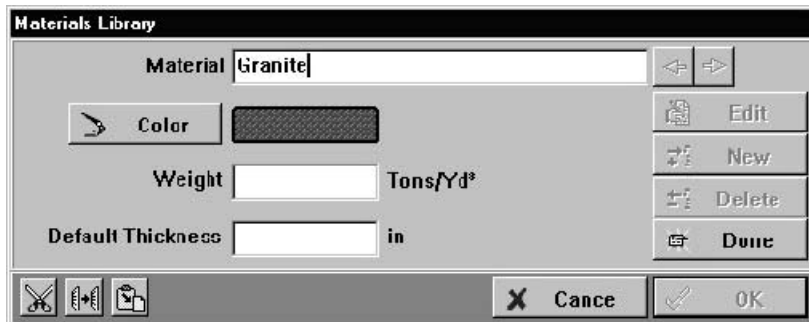
You will notice that the box to the left of the trench view has changed and there is a new set of questions regarding materials and the materials button now reads VOID. Click on the VOID button and you will return to where we started. There is also a way to view both screens at once. In the tool bar above, there is an icon for displaying both at the same time, or you can go to View and select the option to view both MATERIAL and VOID. Click on the "View Void and Material Definitions" icon now. Now you should see both screens for identifying the pipe settings and materials.

Any changes made to material top clearance will affect the material thickness in the pipe settings screen and vise-versa. For now, stay in this double screen.



For this example, we will use thickness for the materials, so we will not be setting the top clearance directly. As each layer is entered, you will notice that the top clearance changes under the pipe setting portion of the screen.

Let's first go in and add a new material definition. Click on the icon that looks like a group of books.



When the screen appears, click on the button and enter a material description of "Granite". Then click on the color and select a color for this material (maybe a red color). Then go to the ton/yd box and enter a 1 as the default and leave the default thickness blank. Click on the "Done" button when finished, then OK. Now Granite fill will be in your materials library. Material 1 will be native material, material 2 is 22 inches thick and material 3 is 16 inches. Under material 1, click on the box labeled native and set the weight to 1.33 tons/yd³. Now lets setup material 2 as granite and give it a thickness of 22 inches with a weight of 1.25. Next, select sand as a description for material 3 following the directions above. Give sand a thickness of 17 and a weight of 1.1.

The last items we will identify on this screen is the cut and fill surfaces. These are the surfaces the trench will cut from and fill to. An example might be that the site has to be rough graded first prior to excavation of the trench and then the backfill is brought to the proposed or final grade. Therefore the cut and fill surfaces will both be proposed. If a surface needs to be changed, simply click on the appropriate button (the button acts as a toggle). Be sure that the cut and fill surfaces are both proposed. Now we are done identifying the trench definition, so lets save it by clicking on the save icon. This saves it to a library of different trench definitions. You might have common trenches that only need slight modifications to their dimensions to reuse. You will not need to

save every trench definition if you already built templates in your library. To retrieve a trench name, simply click on the down arrow next to the name box.

Let's quickly review the settings for this trench.

| | | | |
|--------------------------|-------------|-----------------------------|------------|
| Hinge Height | 48" | Slope | 0.5 |
| Bench | 0" | Bottom Width | 45" |
| Material (Native) | 1 NA | Material 2 (Granite) | 22" |
| Material 3 (Sand) | 17" | Inner Diameter | 18" |
| Pipe Thickness | 1.5" | Bottom Clearance | 6" |
| Side Clearance | 12" | | |

After saving the trench definition, click on the OK button and we will be ready to start inputting the trench off the plan.

You will now be prompted to "touch the FIRST trench point..." our first point is just below the pad and has an invert elevation of 6.8. Now touch the next point and enter the elevation of 8 and finally touch the point at 10.5 and enter that amount. After you have entered the 10.5 elevation click the button on the side of the stylus to return to mouse mode and click on "Finish".

Now would be a good time to save your work. Click on the icon, and call this job "my tutorial" by first selecting the text box for the job and typing from the keyboard. When you have finished entering this text select OK.

8.10 Cut & Fill

When you are done click on the Calculate icon with the hint "**Calculate All Work Regions Cut/Fill**". WinEx Pro will now go through the entire site and compute elevations for the existing and proposed grades, in addition to computing the strata elevations for the site. After this, WinEx Pro will compare surfaces by region to determine the actual cut & fill quantities. When done, you can begin to check out your work. WinEx Pro will generate a detailed report of all the quantities in the report writer (see detailed report in the reference section page 75). This report is editable; simply click where you want to type & begin typing. You can format your text in any system font, size, or style. WinEx will not generate the detailed report, but rather take you to the Answer List.

The Report feature is designed to show you all your job quantities in a simple format. First, you will notice that all adjustments to elevations are displayed. These quantities are tracked separately from cut & fills.

Next there is a breakdown of your site cuts. Each material will be identified in cubic yards/meters, with expansion factors and ton conversions shown. If the material is not useable as a native fill, it will be broken out.

Following the site cuts will be a site breakdown. Again, this should be pretty self-explanatory. Imported fills will also be reported by total.

You can generate quantities for all work regions by clicking on the option and touching Generate. The "Pads" option will consider each pad as a work region if activated. Lastly, the "Import Requirements" will give a region by region accounting of all import needs.

Now click on the "Toggle Cut/Fill Map" icon. This icon will draw in the site showing Cut/Fill map superimposed on top of the proposed surface.

When the screen re-draws, you will see a map depicting a shaded map from red to yellow in the cut areas and green to blue in the fill areas. The legend will display the depths of cut and fill by color. When the map is finished redrawing, the traced in data will appear on screen. You may zoom in to any area on the site by using the any of the zoom icons. Make sure that the map drawn makes sense based upon your perception of the site.

You can use the “Configure” option to select the data you wish to see. The Input On/Off buttons allow you to turn on or off the input information. You may want to turn off certain information (like the existing contours, strata or other items) when looking at the proposed site. This will provide you with a more “clean” view of the screen. In addition, you can turn ON or OFF the topo and spot elevation marking (and even set the font type and size).

8.11 Grid Staking Map

Click on the “View – Toggle Grid Staking Map”. This powerful feature allows you to easily see some of the data that WinEx Pro used in its calculations.

First, check on the map button then select the number of cells per column and row for your display. The line spacing must be in even grid increments, i.e. if your grid cells were 2' x 2' then your spacing would have to be 2', 4', 6', etc. You can always go back to Edit – Change Job Settings to change the grid spacing to conform to your needs (you will need to re-compute your quantities).

For now set the grid spacing to be 20 cells by 20 cells (making your block size 40' x 40'). Set your font to anything other than system, and be sure that Auto-sizing is turned on (this feature automatically sizes your text to fit the block). Click in the Display Value for block. Here you have five choices:

- Average of cells-Display the average elevations and thickness of all cells in the block.
- Upper Left Cell- Displays the actual elevation and thickness for the cell located in the upper left corner of the block.
- Upper Right Cell- Displays the actual elevation and thickness for the cell located in the upper right corner of the block.
- Lower Left Cell- Displays the actual elevation and thickness for the cell located in the lower left corner of the block.
- Lower Right Cell- Displays the actual elevation and thickness for the cell located in the lower right corner of the block.

Select Lower Left and click OK to exit the staking screen. After selecting all your other view options, click OK. WinEx Pro will now draw the cut/fill map in with the Grid Staking Report. You can use the zooming features to manipulate your image to see the actual data computed. This is very handy for error checking purposes and can be printed out to give field-staking information for the job site. When done, click on the icon to turn off the staking map and then turn off the cut/fill map.

8.12 Cross Sectional Views

Now click on the “Cross Section” icon on the speed bar. This option selects a two-point cross section, so touch any two points on the site. WinEx Pro will generate a cross section between the two points showing the existing grade (blue), proposed grade (purple) and strata (in appropriate colors) on the screen, with the first point touched representing the left side of the section.

The vertical scale will be based upon the highest and lowest elevations entered for the job and the horizontal scale will be based upon the distance in feet between the two points selected. You may save and leave the section (with a description) by clicking on the check icon. You may leave the section without saving by clicking on the X icon, print the section by clicking on the printer icon or display the end area of cut/fill (with legend for strata) by clicking on the info icon. To display a saved section, go to the View Cross Sections option and pick saved Slice. By clicking on the small box, you can automatically re-enter the section routine when you are done with the one you are currently viewing.

8.13 3-D Views

Click on the 3D toggle speed-button. This will allow you to view the site in 3-dimensional perspectives, rotated on the X and Y axes.

Turn on the "Toggle Cut/Fill Map" icon, you will see red to yellow for cuts and green to blue for fills on the proposed mesh (surface). Click on the "Configure" icon and make sure to turn off the "Existing", "Strata", and "Other" entered data. Additionally, you can set the grid density to draw (try 33% and go from there). When you exit, the display will include only the 3D cut/fill with proposed contours. Try zooming in to a specific area on the site; use the icon to pick the upper left and lower right area to zoom to, and then touch any two points to frame a small area to display. WinEx Pro will draw the surface in and you should see a clearer picture of the area in question. Click on the "Toggle Cut/Fill Map" icon to turn Cut/Fill mode off and then click on the icon to turn on the proposed grid. When you exit, you will get a fine display of the proposed surface without showing where the cut/fill areas are. Go ahead and play with the various display options until you begin to feel comfortable with the available options (be sure to use the icons to zoom into specific areas).

It is somewhat likely that you have made a few mistakes along the way in your sample plan. Using the methods described previously, scrutinize your Cross-Sections, Cut/Fill Map, Grid Staking Map, and 3D displays to try and detect problem areas. For instance, if the Cut/Fill Map doesn't look right or if the Cross-Section shows a big bump in the middle of the pad or if 3d looks out of whack, there may be a problem. The zoom feature is handy for this purpose because it allows you to see with detail the information you have entered. Another feature that is handy is the "Display Elevations" option. By touching the stylus down anywhere on the site, you will be given the computed existing and proposed grade elevation, along with the cut/fill depth. This tool performs the roll of "sanity check" in that you can easily compare your value for a cell against what WinEx Pro has figured. If they differ, you know you need to find out why.

Note: The 3-D view use rotations on the X and Y axes. The rotation on the X axis by default uses the True Center of Elevation. The *True* center of elevation represents the mid-point of the highest and lowest elevations measured. You can change center of elevation setting in the view options.


8.14 Editing Entries

Let's make some changes to the information we have previously provided. For instance, let's say we incorrectly entered the topo around the pond at elevation 12. For the example's sake, let's say that the topo was supposed to be at elevation 15 instead. To make this change, click on the error correction icon. You will notice that the speed bar changes to offer error correction options. First off, touch the stylus down near the proposed topo you entered at elevation 12. WinEx Pro will detect the nearest point touched (not the nearest line; if you touched two points and had WinEx Pro connect the two, touch nearer to one of the digitized end points) and that entry will begin to flash in red on the screen. Keep touching until you select the proper topo and then switch back to mouse mode (by touching the side button on your stylus). Move the pointer over

the change elevation icon and click. Enter in 15 as your elevation and then return to mouse mode.

To delete an entry, select the item to be deleted using the same methods described and touch the “Delete” (red X) icon. You will get a prompt asking you to confirm your delete prior to proceeding.

To change the color of any entry, select it and touch the “Change Color” icon. Pick the color you want for the entry and then OK.


You may select multiple items for error correction by using the  icon. This will allow you to quickly delete, change colors and set elevations for many items. In addition, you can use the “left/right” arrow keys to scroll through all of your entries one by one.

With this new found knowledge, finish checking and correcting your site. Set the elevation of our pond topo back to 12. When you are done, click on Finish.

8.15 Formulas

WinEx Pro has a very handy tool for taking off miscellaneous items like curbs and paving quantities easily. Click on the “Formula” icon on the speed bar to start the Formula feature. Next you will see the formula library, which includes several pre-made options that are commonly used. Double click on the formula called “Curb”.

WinEx Pro now will run the formula routine. You will first be prompted for the description for this entry, so type in “site curbs” and then the curb width. Go ahead and plug in 8” for both values and then measure up the length of curb along the edge of the road & parking lot. When you are done, the formula dialog box will pop up to allow you to do additional measurements.

After entering the curb, click on the “Ton 2 Layer” formula once and then touch “Edit”. This option allows you to view and edit an existing formula. At the top of the screen you will see the formula title and directly below the title the formula’s equation will be displayed. This formula has the equation “Area* Thickness” (a variable the user enters when running the formula, listed in the bottom right section of the screen) / an inch to foot conversion factor (12), / a cubic foot to cubic yards conversion (27) * the variable cubic yard to ton conversion factor. The output unit is listed in the upper right portion of the window (Tons). In the center portion of the window you will notice that there are “Attached Formulas”. These are additional formulas that will run automatically when the main formula listed is run (they all share the same common set of variables). You can edit these attached formulas by clicking on the formula name and then clicking edit. Go ahead and look at some of the attached formulas to get a feel for how they work. For specific instructions on how to create your own formulas, see the Reference section of the manual, or better yet, click on the  icon and touch the formula icon for online help (the Help Pointer is really handy for getting specific info on icon functions). When you are done, click on done to exit the formula dialogue box. The answers for these formulas will be added to the end of the answer window.

8.16 Site Balancing

Let’s say that we need to balance the site. In order to create a balanced site, the proposed sub grades will need to be adjusted. First, we will need to process the job by clicking on the calculator icon. After the job has been processed, close the report or answer window. Now we will be looking at our site. Click on the “Change Region Attributes” icon.

Here you will have the choice to either balance the whole site or a sub-region on the site. For learning purposes select the total work area, once highlighted, click OK. Click on the region

setting tab and put a check in the box next to proposed sub grade. After checking the box you will notice the balance region or balance site buttons are now highlighted.

Click on the balance region button. WinEx Pro will now reprocess the job and give you a positive or negative quantity in the proposed sub grade box. As proposed sub grade is normally below grade, a negative value will represent an increase in elevation and a positive value will represent a decrease in elevation. Click OK to accept the balance and DONE in the work region attributes box. Now we must incorporate our balanced information into our answers. Reprocess the job. WinEx Pro will display in the report that the proposed grades are adjusted down by sub grade areas. Your site has now been balanced. You may balance a specific work region on the site by using the same process.

NOTE: The balance site and balance region feature will adjust proposed grades so that cut and fill volumes will closely match each other. WinEx Pro uses tight, neat, unadjusted volumes to calculate the balance. i.e., the Shrink and Wwell factors are not incorporated in the site and region balance calculations.

9.0 WinEx Pro Slope Routine Tutorial

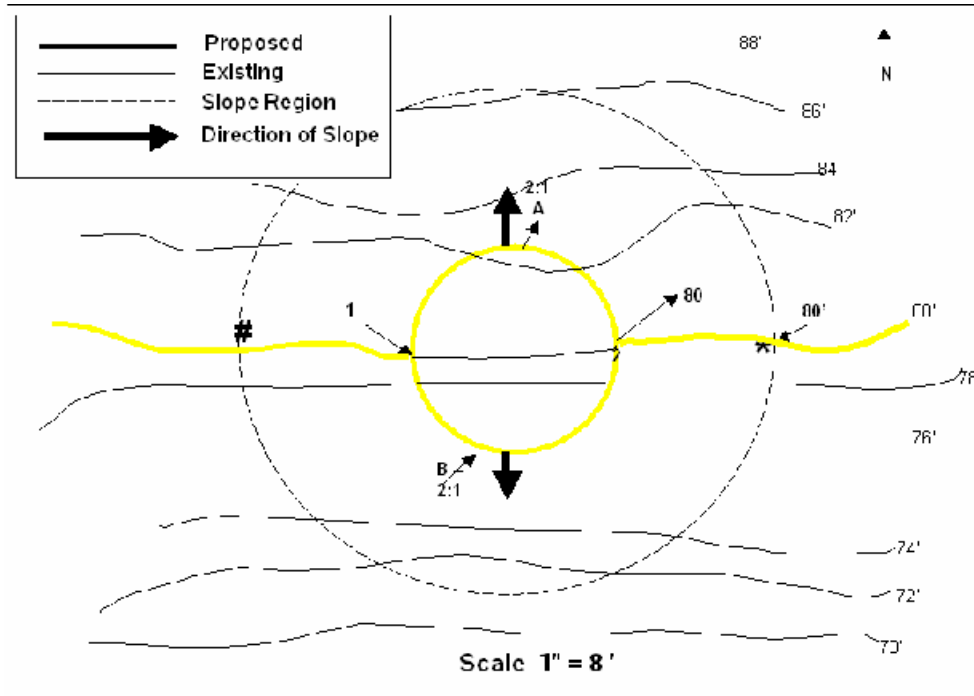
What's it for? The slope routine is used when an estimator knows the elevations that define the beginning of a slope (see the glossary for complete definition), and the pitch or angle of the slope (1, 2, and 2.5, whatever) and nothing else... The slope routine calculates the unknown end of the slope, where the slope meets existing grade, also called "daylight."

When to use the slope routine? When you know elevations of only one end of the slope area, the "pitch" of the slope and nothing else, that's when WinEx Pro's slope calculation routine works wonders. If you know the elevations of both the top and the bottom of a sloped area, you do NOT need the slope routine. By putting in the elevations for the top and bottom (with contours or spot elevations), WinEx Pro will calculate an even slope between the two elevations.

As part of this exercise you will calculate the cut and fill generated by a circular pad being built on the side of a hill for a water tank. Half of the pad will be cut into the hillside, and the other half will be built out onto the hillside. We know the elevation of the pad, and we know that the cut slope is to slope up and away from the pad at a specified slope of 2. WinEx Pro will maintain this engineered cut slope until it meets the existing grades, or daylight.

Similarly for the fill portion of the job, we need to have the fill dirt slope down hill from our pad at a negative 2:1 slope... We know the elevation of the edge of the pad, and we know the slope, but we don't know where down the hill that slope will end where it meets existing grades. This is exactly what the slope routine is designed to handle.

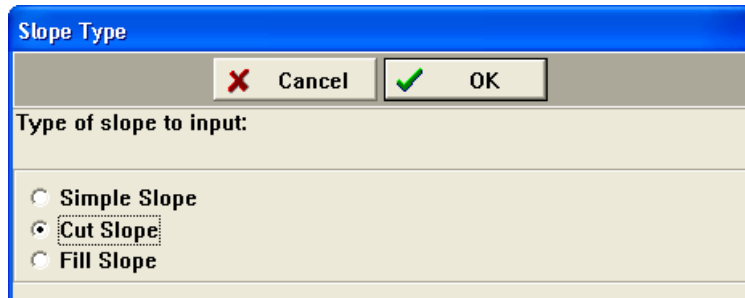
Lets begin. This blueprint was created specifically to instruct you on how to input both cut and fill slopes. Start the blue print, as a new job, using your knowledge of WinEx Pro and input the start up work region as specified on the plan, and then the existing grades elevation 72 through 88.



Enter the proposed circular pad at Subgrade elevation 80 and the two proposed topo lines, also at elevation 80. That's all of the proposed information we have available to us. If we processed the job right now, WinEx Pro will calculate the proposed grades sloping evenly from the edge of the round pad, all the way out to the limits of work. As an educational exercise, go ahead and do this and view the 3-D image of the proposed surface to see for yourself what has been calculated WITHOUT the use of the slope routine.

Back to work; if you haven't already, get back into 2D mode and turn off any of the shading maps you might have turned on while looking at the hill previously. Click on the icon that begins the slope input function.

You are presented with three options (see Slope Type);



Fill slope, cut slope and simple slope. These are three very different types of slopes, so carefully read the definitions in the glossary.

We will start with a slope going into the hill at the back of the pad. Choose the cut slope radio button on the menu on your screen, and choose "OK". The yellow prompt line is asking you to touch the first point of the slope base. Keep in mind that the word "base" does not imply that it is lower in elevation than the slope; it simply indicates the points where the slope begins.

Touch the stylus to the point that begins our cut slope, indicated on our plan as point 1, and give this point the elevation of 80. WinEx Pro then prompts you for the next base point, which is at point 2, also elevation 80. BEFORE you choose OK, indicate that you want to "trace path" between your two points, then click on OK. (if the base of our slope had variable elevations, you would input a base

point at every different known elevation along the base). Trace the half of the circle that defines the edge of the pad from point 1, through point A and finishing at point 2.

Click "Finish" once to indicate that you have finished tracing, and Finish again to indicate that you have finished inputting the base of your cut slope.

You are prompted for a description for the sloped area, let's call this "tutorial cut slope". After clicking on OK, you will be prompted for the slope of the sloped area. Our slope is a 2 (see Slope in glossary), so we type in the numeral 2, and click "OK". Next step is to trace the boundary of the slope area. The boundary of the slope area has it's own perimeter, IE, the base of the slope cannot be assumed to be part of the boundary of the slope. To properly input the cut slope area we will start at point 1, then touch point #, then trace the curve (represented by the dotted line on the uphill side) around to the point *.

Next click point 2, and trace the perimeter of the pad around to point number 1, going through point A. Click "Finish" to finish. You will be offered the standard work regions stripping and Subgrade input screen, but as that does not apply here, simply click on the OK button to bypass.

Congratulations, you have just input your first cut slope. Now that we are full of positive energy and an overwhelming sense of accomplishment, lets jump right in and input the fill slope. I will speed up the instruction, as this slope is almost a reverse of the one you just finished. Indicate that you wish to input a slope and choose fill slope this time. The first point of your base will be point 1 at elevation 80, the second point will be point 2, also at elevation 80. Trace the base from point 1 to point 2 around the circle through point B. Click "Finish" twice (once to finish tracing the base path, and once to finish inputting base elevations).

WinEx Pro prompts you for a name of the area of our fill slope, so let's try "tutorial fill slope". Input the slope of our fill slope. REMEMBER that a slope that falls away from the base is a NEGATIVE slope. Input -2 as your slope. (FYI, you have to enter the numeral 2 before you can assign it the negative attribute), and click on OK.

WinEx Pro now prompts you for the boundary of your slope. Start at point 1, then point #, trace the dotted line down hill and around to point *, then point 2, and then around the curve through point B ending at point 1. Click on "Finish", and the OK on region settings (to bypass stripping and Subgrade).

Click on the calculate button. Once WinEx Pro has crunched all the numbers for the slope (and there are a lot), you will see your report. Close the report, and go to 3-D to see what the proposed surface looks like. Note how the slopes, both uphill and downhill, are now much crisper than when you first viewed them (at the beginning of this exercise)... that's because the slope routines specified a precise 2:1 slope to be calculated.

Congratulations, you have just finished one of the more intricate routines in WinEx Pro... take your seat at the front of the class.

10.0 Export a Data Collector (*Pro only)

This routine will export a text file that contains elevations of the site (either existing or proposed) on a given interval (determined by the layout of the grid staking map). IE, you will receive points that indicate the northing, easting and elevation of a point on your site on a grid every X feet. To do this you need to have the job processed first, then click on generate, then data collector file, and then choose your surface.

You will be prompted for the file to export: this is whatever name you want the text file that contains your data points to be called. You can call it "test export file" for now. This file, by default will be created and saved to the same directory where the takeoff file is stored.

Next is the device type; again you decide this. If you work with a series of data collectors, you may have different configurations for each. By naming the device, the configuration will be saved.

Data scale and Coverage region buttons are obvious. The alignment method will require you to have a northing and an easting for at least one point that you can indicate on the plan with the digitizer. This point or points (depending on your choice) are not necessarily the same as the reference points you input when starting this project. All of the data points that WinEx Pro creates in this function will be relevant to the point(s) you use for the alignment method.

Click the configure button to the right of device type to indicate the specific output format. The device type for this configuration will carry over in this screen. You then indicate the file extension that is required by the particular device you are exporting to. The device manufacturer determines this, so contact them for that info. Most devices will accept a variety of formats, but again, it is up to the device as to which format is preferred. WinEx Pro allows you to create a file with any extension so that we can conform the output file format to your needs. Most devices will accept a .txt extension, so use that for our exercise.

Choosing the format is the last task. WinEx Pro outputs four relevant pieces of information about each point on the elevation grid. In user definable order, you can have the northing of each point, the easting of each point (determined by it's location relative to the point(s) you indicated earlier) the elevation of each point and the number of the point in the series created. WinEx Pro will automatically separate each point with a comma. North is indicated by capital N, East by capital E, Elevation (or height) by a capital H and the number by the # sign. You create the order that the device requires this information by typing it into the format box. Do not separate with commas or spaces. If we used "#NEH" we will get the number of each point, a comma, the northing of each point, a comma, the easting of each point, a comma, the elevation (or height) of each point, and a comma. I bet you get the idea. Proceed with the example configuration I used to create the test file. If you are curious exactly what all that information looks like in a text format, you can open the file using MS WordPad.

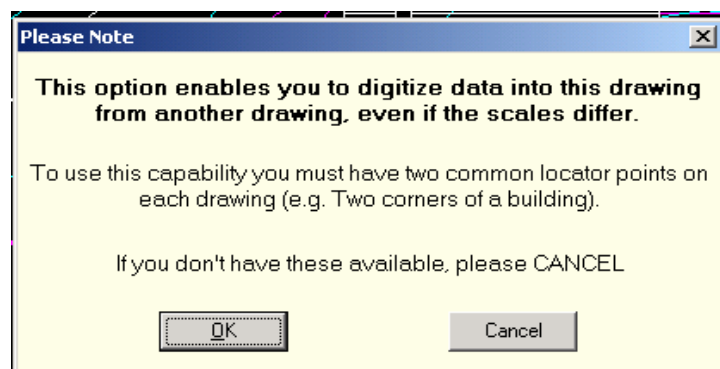
11.0 Working with Drawings of a Different Scale:

Select **Tools > Locate Secondary Plan** option.

After choosing "Locate Secondary Plan", you will be prompted through steps to work with your secondary drawing.

Note: the common locator points for this function DO NOT have to be the two reference points you indicated during the start-up input of this project.

The two locator points must be available on both the original and secondary drawing, and represent the same two points on the jobsite.



In the help window above, the two locator points on the original drawing would represent the same two corners of a building pad that the locator points on the secondary plan represent, for example.

Click Ok and note the message on the Prompt Bar, prompting you to touch the Locator Points on the Original Current Plan:

After which you will be prompted to place the secondary drawing on your digitizer.

Now place the secondary drawing on your digitizer now in preparation for the user to enter the locator points on the secondary blueprint.

You are now prompted to touch the first locator point on the new (secondary plan) and then the second locator point. Once you have identified the two locator points on the second plan, WinEx/WinEx Pro will request that you enter the scale of the "secondary" drawing:

Enter the scale when prompted for the secondary drawing. Say 1" = 30 ft.

The program will now calculate the physical distance between the two locator points on the secondary plan (based on the length between digitized points and scale) and compares these to the those represented by the locator points on the primary drawing.

WinEx/WinEx Pro will then display the percentage differences between its own computed scale for the secondary drawing and the user-entered scale, with choices to accept either of these or to re-enter the locator points for closer agreement.

The following are the choices:

Use Entered Scale – WinEx/WinEx Pro will automatically accept the scale you entered and adjust the input from the secondary drawing to reflect that adjustment.

Use Calculated Scale – WinEx/WinEx Pro will automatically override the scale you entered and use the scale that was calculated from the two points entered on the secondary drawing.

Re-Enter Locator Points – Re-enter the Locator Points for closer agreement.

You are now ready to begin inputting information from the secondary plan.

Note: It is important to realize that you are inputting information from the second plan INTO the original plan, so the plan on the screen will not resize. The information you are digitizing from the secondary plan will be resized (if required) by WinEx/WinEx Pro to display appropriately on the original takeoff image once you switch back.

Input the information on the secondary plan in the same methods you have learned thus far in the tutorial. When finished with the input from your secondary plan, Choose **Tools > Return to Original Plan**.

Note: If you simply finish your takeoff and save the file, that file is returned to the original plan input. In other words, when you open the plan you saved, after finishing input from a secondary plan, it will open at the original scale and orientation. All of your secondary input will be part of the file, but any new input will be interpreted as coming from the original plan.

After you **return to the original plan**, all further measurements will be considered as being referred to the original plan.

You can repeat this process for as many “secondary” drawings as you like, as long as each “secondary plan” and the original plan have common locator points.

12.0 Import From DXF file (*Pro only)

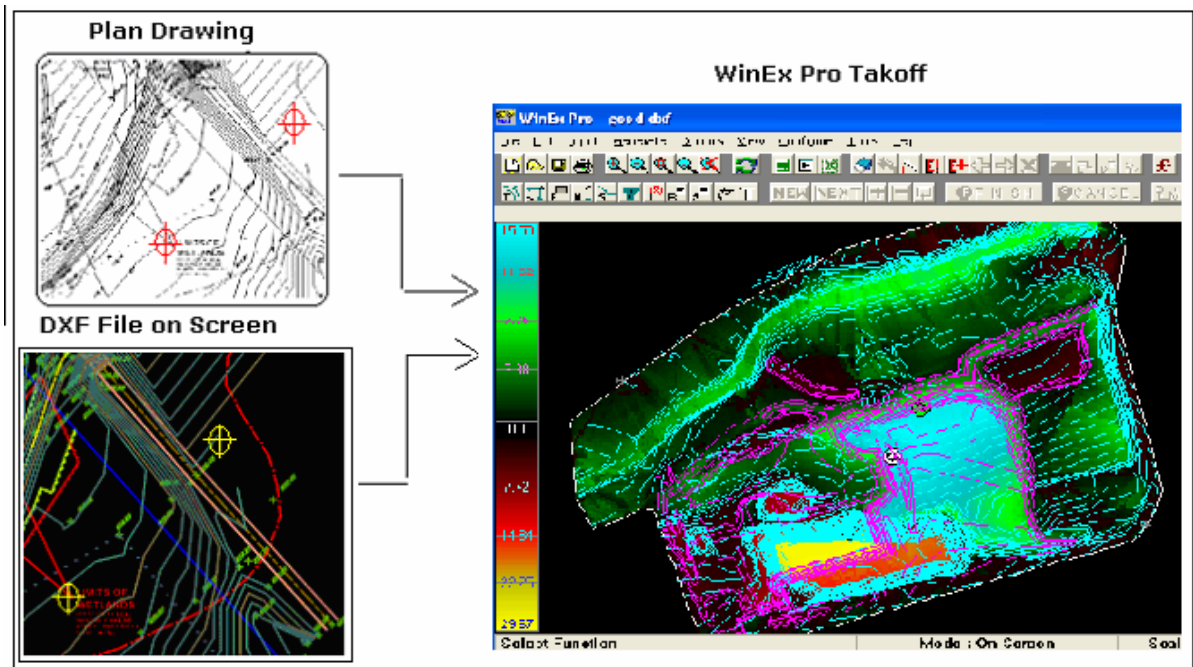
This option will allow the importing of data in to the current WinEx Pro job from a DXF File. You can import data directly from any DXF file and avoid digitizing the data manually.

You can either start a job by importing a DXF file or import DXF data at any stage of the job.

The DXF import function will display a new set of speed buttons and prompt you to open the electronic plan. You can view the layers in the displayed image and selectively turn on and off the layers of interest. Then, you can select items to import either by individually selecting items or layers, or by selecting all of the displayed items.

Once you have selected the items, make sure that all of the imported items for proposed fall within the Total Work Region. The program requires you to define and set common locator points in both the DXF file and the WinEx Pro file to synchronize the data to be brought in. When starting an “On Screen” takeoff with a DXF file the system automatically designates appropriate locator points within the WinEx Pro job so you will only need to designate the points within the DXF file.

Note that the two pairs of points can be in any orientation and can have different screen distances between each pair of points so long as they correspond to each other.



13.0 Reference Section

13.1 Digitizer Vs On Screen

The first point to remember is that a plan, whether in soft copy or hard copy, has size and scale criteria. Normally, the digitizer defines or affects these. The same is true in the case of On Screen takeoffs, in which case, a “virtual” digitizer replaces the physical digitizer. The virtual digitizer can be sized to the largest physical digitizer available, which is 60” x 60”. With WinEx Pro you don’t have to worry about or set the size of the virtual digitizer, but you need to be aware of the parameters involved.

13.2 Job Boundary - Total Work Region

The boundary for the job is very important as it has a direct impact on the quantity calculations. This is because the program uses the boundary to “daylight”. Therefore, the smallest total work region that encompasses all of the proposed work yields the best results. However, note that the program allows and will use existing elevations and topo information outside the total work region to create a representative existing surface. No cut and fill quantities will be calculated outside the Total Work Region.

13.3 Daylighting

Daylighting, in its simplest definitions, means sloping from a known grade toward another known grade. The program will attempt to daylight across the boundary that represents the total work region, with the information it has of existing and proposed elevations.

13.4 Bore Samples

WinEx Pro allows defining and entering bore samples to define strata layers. WinEx Pro calculates the strata layer elevations by creating triangular surfaces between bore holes and using elevation oriented layers.

13.5 Secondary Drawings and Locator Points

When working with hard copy (digitizer mode) plans, you will be able to switch digitizing to a new related drawing, but you need to keep in mind two things: both the drawings must have common locator points and the imported proposed work must lie within the total work region defined for the job. When measuring on screen, in mouse-mode, the secondary drawing option is disabled.

In the case of DXF files, it is similarly possible to “switch” to another DXF plan, but keep in mind that this entails redefining the locator points. Any discrepancy in doing so will compromise the calculated results for the entire job. This is more significant in the case of electronic files given that they can be “resized” easily (zooming), and thereby introduce discrepancies in relocating reference points.

14.0 Glossary of Terms

BALANCE: A site or region “balances” when there is no earth needing to be imported or exported from the site to achieve the proposed grades (i.e. cut equals fill).

CROSS-SECTION: A “slice” through the site on the plan “top” view that is displayed horizontally from a “side” view, drawn between two points. Often the scale of a section will be displayed in dual format – the scales are not equal in horizontal and vertical directions.

CUT: Earth being excavated, or “dug up”. Found when the elevation to grade to (proposed) is below existing ground

DAYLIGHT LINE or POINT: The place on the site where the proposed surface matches in elevation the existing surface; may or may not be displayed on the plans. Often used in conjunction with slope (“slope to daylight”).

EXPORT: Dirt that needs to be hauled off the site in order to achieve proposed grades. This is caused by either an excess of cut or the presence of “unsuitable” cut material.

FILL: Material to be placed, or “fill in”. Found where the Final (proposed) grade is at a higher elevation than existing ground.

BORROW / IMPORT: Dirt that needs to be brought onto a site in order to achieve proposed grades.

PAD: In WinEx Pro a pad is defined as a portion of the site that is at a constant elevation (flat), inside the perimeter traced by the user. A pad may or may not include proposed sub grade (concrete, asphalt etc), whereby the final elevation is automatically adjusted to account for these materials.

PROPOSED SUBGRADE: An adjustment to the final grade elevations that reflect the requirements to over excavate and fill a region with specific material (s) such as concrete, asphalt, base etc.

WinEx Pro considers sub grade materials to be material that sits below final grade and above the graded earth.

SHRINK: A factor applied to bank yards to approximate the amount a material will need to be compacted when placed in to the ground. Also referred to as “compaction factor”. Entered with 1.0 as the base, a yard of material (bank) with a .95 factor will shrink by 5% thus requiring slightly more material to arrive at final grade.

SPOT ELEVATION: Any point on the plan that lists one “spot” on the print as a known elevation.

STRATA: In WinEx Pro strata refers to subterranean layers of the site in question such as the different materials below topsoil like sand, shale, clay, peat, rock etc. Strata information can be obtained from the soil engineers’ bore logs of the site.

STRIPPING: Removing a constant thickness of earth from the existing surface prior to beginning the cut/fill process. Frequently done to remove the top bit of the existing surface that contains roots, grass and other undesirable material.

SWELL: The opposite of shrink. A factor applied to bank yards to approximate the amount a material will “fluff” when removed from its natural state in the ground. Also referred to as an expansion factor. Entered with 1.0 as the base a yard of material (bank) with a 1.1 factor will swell by 10%, thus increasing haul totals.

TOPO LINE (topo): Topographical line on the prints indicating a constant elevation along that line. Also known as contour lines.

WORK REGION: Any area on the site for which the user desires to identify a unique attribute, such as topsoil stripping, proposed sub grade, shrink/swell factors or import materials. Can also be used to derive cut & fill quantities inside any perimeter.

IMPORTED MATERIAL: As used in the WinEx Pro report. A material that is input in the “sub grade material” portion of a region attributes screen. These are frequently the purchased materials such as concrete, asphalt, crushed stone, etc.

SLOPE GLOSSARY

Slope

A portion of a job site where the proposed surface is required to rise or fall at a specific engineered rate or pitch. The angle of this rise or fall is constant throughout the sloped area.

The pitch or gradient factor of a sloped region. WinEx Pro requires that you enter the slope, or angle, of your sloped region as one vertical unit to so many horizontal units. A slope factor of 2 defines a slope rising 1 unit for every 2 feet of run. If the slope is falling away from the base, enter the slope factor as a negative. A slope of – 4 means that the slope is falling 1 unit for every 4 horizontal units.

Cut Slope

A slope of constant pitch, that you define, which cuts the existing soil to maintain the constant specific pitch of the slope. The routine will continue the “plane” of this cut slope until it runs out of a surface to cut. Once the plane of the slope has risen above the existing surface, or reached daylight, the slope stops where the proposed cut slope has met the existing grades. In our tutorial, the cut slope rises 1 unit for every two units it cuts into the hillside away from the back half of the circular pad, and maintains that rising cut slope at 1 to 2 until it reaches the surface of the hillside uphill from the circular pad. Once it reaches the surface of the existing, the slope stops.

Fill Slope

A slope of constant pitch, that you define, that fills over the existing surface to maintain the constant specific pitch of the slope. This routine will continue the “plane” of the fill slope until it tapers into the existing surface. Once the plane of the slope has intersected the existing surface, the fill slope stops. In our tutorial the fill slope falls 1 foot for every two feet that it heads downhill from the front of the circular pad, and maintains that NEGATIVE 2:1 (because it is falling, rather than rising away from the starting elevations of the slope) until it meets the surface of the hillside downhill from the pad. Once the proposed slope reaches existing grade, the slope stops

Simple slope

A slope where WinEx Pro will cut or fill the existing surface to maintain the user input slope. This routine will cut all material above, and fill all material below, the defined slope, and maintain this until it reaches the edge of the region that you defined as the region to slope. Because this slope cuts and fills wherever necessary to maintain the slope, the simple slope has very limited application in most of the construction project this author has been exposed to.

15.0 HELPFUL HINTS and FAQ

PRINTING - Print both WinEx Pro graphics and reports in Landscape mode. You will be happier with the output.

EXPANSION AND COMPACTION FACTORS – An expansion factor of 1 will have the effect of no expansion. The same goes for compaction. Think of the factor in terms of percentages, a factor of 1 equates to 100%. This means that the cut dirt with an expansion factor of 1 (100%) will occupy 100% of the volume after cut as before. It did not “fluff” up. In the same way, a compaction factor of 1 (100%) means that the in place dirt will occupy 100% of the volume it did before placement. It did not “shrink”. Expansion factors with fluff are greater than 1, compaction factors with shrink are less than 1. What many people would call an expansion factor of 15% would be typed into WinEx Pro as an expansion of 1.15 (100% + 15%). WinEx Pro multiplies the bank cut yardage, say 1200 yards by the expansion factor of 1.15 yielding 1380 expanded yards of cut. 1380 is 115% of the bank 1200 yards.

If you have a compaction factor of say, 12%, subtract that percentage from the 100% of a 1.0 shrink factor. This would yield a compaction factor of 88% or .88. This means that the fill volume will be divided by .88 to determine the number of yards of earth required for the compacted fill. If we had a compaction factor of 12%, which is input into WinEx Pro as .88 (decimal equivalent of 100%-12%) on a fill of 1000 yards, WinEx Pro divides 1000 by .88 and gets 1136 yards of un-compacted fill required.

SPOT ELEVATIONS: - If you are faced with a blueprint where a portion of the topographical info is simply a grid of spot elevations, use the connected spot elevation input method.

16.0 HOT KEYS

| # | Function | Hot Key |
|----|--------------|--------------------|
| 1 | Pan Up | Up Arrow |
| 2 | Pan Down | Down Arrow |
| 3 | Pan Left | Left Arrow |
| 4 | Pan Right | Right Arrow |
| 5 | Rotate Up | Ctrl + Up Arrow |
| 6 | Rotate Down | Ctrl + Down Arrow |
| 7 | Rotate Left | Ctrl + Left Arrow |
| 8 | Rotate Right | Ctrl + Right Arrow |
| 9 | Zoom In | Shift + Up Arrow |
| 10 | Zoom Out | Shift + Down Arrow |
| 11 | 3 D | Alt + 3 |

Please contact Roctek at 800 826-7763 with questions, suggestions or for more information